A

TREATISE

ON

THE EPIDEMIC CHOLERA,

AS IT HAS PREVAILED IN INDIA;

TOGETHER WITH

THE REPORTS OF THE MEDICAL OFFICERS,

MADE TO THE MEDICAL BOARDS OF THE PRESIDENCIES OF

BENGAL, MADRAS, AND BOMBAY,

FOR THE PURPOSE OF ASCERTAINING A SUCCESSFUL MODE OF TREATING THAT DESTRUCTIVE DISEASE:

AND

A CRITICAL EXAMINATION

OF

ALL THE WORKS WHICH HAVE HITHERTO APPEARED ON THE SUBJECT.

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1832.

TO

THE RIGHT HONOURABLE

LORD WILLIAM CAVENDISH BENTINCK,

G. C. B., G. C. H.

Governor General of India,

&c. &c. &c.

My Lord,

My object, in inscribing this volume to your Lordship, is neither to offer the incense of adulation, which your understanding would reject, nor to solicit the notice of exalted rank to a work, which being strictly professional, can claim support only from its intrinsic merits, and the importance of the subject. But your Lordship's patronage having enabled me to hasten the publication of the following pages, I trust you will be pleased to accept this address as expressive of the deep sense which I entertain of your Lordship's generosity and kindness.

I have the honour to be,

My Lord,

Your Lordship's most obedient,

humble servant,

FREDERICK CORBYN.

Fort William,
1*st March,* 1832.

ERRATA.

Page 109 1st paragraph 18th line, *for* ' its' *read* ' it.'
,, 157 3rd par. 9th line, *for* ' appearace' *read* ' appearance.'
,, 200 3rd par. 10th line, *for* ' texture' *read* ' substance.'
,, 208 3rd par. 6th line, *for* ' biat' *read* ' fiat.'
,, 294 3rd par. 9th line, *for* ' 5' *read* ' 57.'
,, 331 3rd par. 8th line, *for* ' case' *read* ' cases.'
,, 332 2nd par. 1st line, *for* ' Mr. Mellis' *read* ' Dr. Mellis.'
,, 333 5th par. 3rd line, after ' within' *add* ' the.'
,, 335 1st par. 11th line, *for* ' ss.' *read* ' ℥ ss.'
,, 350 3rd par. 14th line, *for* ' preceptible' *read* ' perceptible.'

PREFACE.

In submitting the present work, it may be proper to meet the inquiry respecting its necessity, when so many treatises have already been published on the nature and treatment of the Epidemic Cholera. For this purpose, the author requests the attention of readers to a statement of the motives which induced this undertaking, and of the plan on which it is conducted.

Among the publications on the subject, many of them written by gentlemen of acknowledged talents, and some by those whom, from personal knowledge, the author has great reason to esteem, there is none, he conceives, adapted to serve as a book of reference. Every writer has set forth his own views, and supported them by proofs drawn from his own practice; circumstances which render the works alluded to more suited for a substratum on which to form a general view, than to serve as guides to the practitioner who consults them without the advantage of personal experience of the character of the disease. These works were also, most of them, written at an early period of the progress of the disease, by which the authors of them were necessarily deprived of the benefit of comparing their own ideas with those of preceding observers.

The pretensions of the present treatise, to be considered as a work of reference, consist in three particulars:—1. It contains a statement of the author's own

opinions.—2. An examination of all the works that have yet appeared on the subject.—3. The result of the different modes of treatment of the disease.

With regard to the author's own opinions of the proximate cause of Cholera, and the treatment thereby indicated, it would have been unnecessary to say any thing in this place, but for the misconceptions on the subject which he has with pain observed in some instances. It becomes incumbent, therefore, on the author to repeat here what he has more fully explained in the body of the work. He regards the cause of Cholera to consist in inequalities of weather producing sudden check of perspiration, a determination of blood from the surface to the centre, and consequent inflammation internally, at the same time that the skin is seized with a deadly chill. The remedies he would prescribe, in this state of excitement within, are principally the immediate exhibition of *sedatives*, with the careful *exclusion of stimulants* of every kind. This treatment the author adopted and recommended, almost from the first moment that he observed the Epidemic in the central division of the grand army, to which he was attached as Staff Surgeon: his surprise, therefore, may be conceived when he finds himself described as directing the use of brandy and other powerful stimulants, as a part of the remedies which his system comprised!

The author has not confined himself, in this work, to the development of his own views, as this plan would have coincided with those of all the other works on Cholera; but has entered into an impartial examination of the merits of all the publications on the subject, to which he has had access. These publications include treatises published at different times by the authors themselves,

and the Reports which have been published by the Medical Boards of the three Presidencies. The independent treatises require no further notice here; but of the Reports it is necessary to give some account.

The Honourable Court of Directors, in consequence of a request by the Supreme and Local Governments of Madras and Bombay, that their respective Medical Boards should preserve records of the Epidemic Cholera, having ordered, that the particulars of the progress of that disease through their territories, with the different modes of treatment, should be prepared and printed; the Medical Officers accordingly transmitted their Reports to the Medical Boards of the three Presidencies. These Reports were published, with the view of affording to the Faculty in England, and elsewhere, such information, on the nature and treatment of the disease, as might be useful in checking its progress and ravages. These documents, however, are only partially known; and although they are valuable in themselves, and extremely interesting, yet they are drawn up in a manner so desultory, the matter is so voluminous, and the opinions on the theory and treatment of the disease are so diversified, that a general reader finds it difficult to possess himself of the material portion of their contents, and to arrive, through so many conflicting opinions, at a just and satisfactory conclusion: indeed, for the task of an attentive perusal of them, which their voluminous form renders both laborious and tedious, few readers have either the inclination or the leisure.

With the view, therefore, of promoting the interests of Medical Science, and the welfare of humanity, the author has endeavoured to furnish his readers with a critical examination of them, in order to point out the

most successful mode of treating the Epidemic Cholera. Being desirous that the views and practice of the several writers may be adopted, as far as experience has confirmed their propriety and efficacy, he has given their names, and quoted their own words in the description of their treatment; thus offering both proof of his impartiality, and grounds for securing the confidence of his medical colleagues.

As the excellence of every mode of treatment must arise from its success, the author has carefully attended to the result of every system yet offered to public notice; and he is willing, that the merits of his own views should be decided by this infallible test. It will appear to every unprejudiced reader, that while, on the one hand, the method of administering stimulating remedies has almost totally failed, the exhibition of sedatives has been successful to a degree which completely establishes its superiority over the other plan. The failure of the one, and the success of the other in a few instances, does not invalidate the conclusion. If sedatives have not successfully operated in every case, the reason of it, as will be clearly perceived in the course of the following pages, is that they were not prescribed sufficiently early. Nor is it surprising, that stimulants, though generally pernicious in their operation in Cholera, should have succeeded in some cases: difference of constitution, strength of the disease, and other circumstances, are sufficient to account for these exceptions to the general want of success of the stimulating plan. It is the general effect which must be taken into account, in estimating the comparative merits of the two modes of treatment. "In a limited observation," Sir Gilbert Blane has remarked, "to which only one or

more cases, of the most infrequent effects of a medicine, may have occurred, one is in hazard of erecting an exception into a rule, by mistaking these facts for instances of the universal effects of it. It is only by computation, founded upon *large averages*, that truth can be ascertained; and hence the danger of founding a general practice on the experience of a single case, or a few cases."

On the subject of the cause of epidemical influence, which still continues, in a great measure, inexplicable, the Author deems it unnecessary for him to bestow attention; while he has, to the full extent of his ability, directed to such preventives as experience has proved effectual.

These pages have been written with no view of exhibiting brightness of intellect, powerful thought, or laborious research. The Author's aim has been the discovery of truth; he has honestly sought it, and, to the best of his knowledge, faithfully declared what ought to have been, but was not done, and what should now be done, for the removal of one of the most awful Epidemics on record, which is now spreading its evils and sufferings over all Europe. In the critical review of the opinions of his brethren, while he has solemnly protested against some speculations, displayed in a seductive garb, but unsupported by practical or clinical experience, he has carefully abstained from the language of disrespect or illiberal censure.

The Author takes this opportunity to acknowledge the obligation he is under to the Medical Board of the Bengal Presidency, for the privilege allowed him of inspecting the Original Returns and Reports in their Office.

It is gratifying to the Author to perceive the following favourable notice of his treatment of Cholera, in the Russian Hufeland's Journal:

"The treatment recommended is that employed by the best English practitioners, and consists in the administration of large doses of calomel and opium, early blood-letting if re-action has taken place, the warm bath and warm clothing, together with counter-irritants to the surface, and the use of opiate injections. When the vomiting has stopped, they advise a gentle laxative, such as carbonate of magnesia, or the cold drawn castor oil to be given.

"This formidable disease, which does not last beyond the third day, and is often fatal within twenty-four hours, requires the most active treatment from the physician. The MARQUIS OF HASTINGS made the treatment recommended by CORBYN, generally known throughout the army, and which subsequent experience has proved to be the most efficacious."

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Statement shewing the Places chiefly visited by the Epidemic Cholera, with the Years and Months of its prevalence.

The Years	The Months	The Stations	Squares on the Map	The Years	The months	The Stations	Squares on the map	The Years	The months	The Stations	Squares on the map	The Years	The months	The Stations	Squares on the map
1769		Madras	17	1818	March	Ganjam	15	1818	July 30	Poona	12	1818	Novr 1	Trichinopoly	17
1770		"	17	"	"	Allahabad	4	"	"	Pangur		"	" 6	Seringapatam	17
1774		"	17	"	April	Midnapore	10	"	"	Meerut	3	"	" 10	Nagore	17
1775		Island of Maurilius		"	"	Tylyra		"	"	Saharunpore	3	"	" 14	Cuddalore	17
1787		Vellore	17	"	"	Gorruckpore	4	"	" 10	Aurungabad	13	"	" 19	Sunkery	7
1788		"	17	"	"	Oude	4	"	" 14	Nusseerabad	8	"	" 20	Tanjore	17
1789		"	17	"	"	Fyzabad	4	"	" 14	Mulligaum	7	"	" 20	Coombaconamee	17
1790		Seringapatam	17	"	"	Lucknow	4	"	"	Candeish	7	"	" 12	Salem	17
"		Travancore and the		"	"	Cawnpore	4	"	Augt 13	Hooble		"	" "	Negapatam	17
"		ceded districts	18	"	"	Jubbulpore	8	"	" "	Darwar	12	"	" 25	Tellichery	17
1814	May 29	Jaulnah	13	"	"	Billoor in Cawnpore	4	"	" 14	Bombay	12	"	" 30	Coimbetoor	17
1817	"	Nuddea	10	"	"	Naufghur		"	" "	Orgalee		"	" "	Madura	18
"	"	Kishnagur	10	"	May	Oujen	8	"	"	Chanda	12	"	"	Doorgasolem	
"	June	Mymensing and along		"	"	Thanoor		"	"	Ahmednugger	13	"	"	Vizigapatam	14
"		the Burrumpootur	11&6	"	"	Hussingabad	8	"	"	Salara	12	"	"	Isle of France	
"	July	Patna	5	"	"	Mullaye	8	"	"	Kurrah	13	"	Decr 5	Cannanore	17
"	"	Sunegong		"	" 15	Nagpore	8	"	"	Chandore	7	"	" 8	Cochin	18
"	"	Kishnagur district	10	"	" "	Vizigapatam	14	"	"	Badamy	13	1819	Jany 1	Palamatta	
"	Augt	Jessore	10	"	" 20	Vizinagram	14	"	"	Jeypoor near Ajmere		"	"	Rajamundry	14
"	"	Dinapore	5	"	" 31	Rungunghat		"	"	Hissar	3	"	"	Combeecorum	17
"	"	Calcutta	10	"	"	Goongong in Dehlie	3	"	"	Charmulgooley		"	"	Nagore	17
"	"	Nursingunge		"	"	Etawah	3	"	"	Panwel in Bombay	12	"	"	Mangalore	16
"	"	Dacca	11	"	"	Tirhoot	6	"	"	Salsette	12	"	"	Coimbetoor	17
"	"	Chittagong	11	"	"	Tirace	1&3	"	"	Surat	7	"	"	Trichinopoly	17
"	"	Rajashahye or Nattore	10	"	"	Muttye	5	"	"	Hansi	3	"	"	Cochin	18
"	"	Bhaugulpore	6	"	"	Benares	4	"	"	Kurnaul	3	"	"	Trivandrum	18
"	"	Monghyr	6	"	"	Jaunpore	4	"	"	Paneeput	3	"	"	Mauritius	
"	"	Nattore	6	"	"	Sultanpore (Oude)	4	"	Sept 8	Bellary	13	"	"	Ceylon	
"	"	Sylhet	11	"	"	Bhaugpore		"	" 12	Hurrighur		"	"	Juffernapatam	
"	Sept 15	Balasore	10	"	"	Saugor	8	"	" 15	Chittledroog	17	"	Feby	Gooty	13
"	" "	Burrisaul	11	"	"	Nursinghur	10	"	" 20	Nellore	17	"	"	Cunnanore	17
"	" "	Poorneah	5	"	"	Poohoorah		"	"	Soonda	16	"	March	Quilon	18
"	" "	Dinagepore	5	"	"	Bhilsah	8	"	"	Tennah in Bombay	12	"	April	Hoobly	
"	" "	Sylhet	11	"	"	Bhopal	8	"	Octr 1	Tripetty		"	"	Hudarry	
"	" 17	Buxar	4	"	June	Nipaul	4&5	"	" 6	Gooty	13	"	May	Soonda	16
"	" 18	Chuprah	4	"	"	Katmandoo	6	"	" 8	Madras	17	"	"	Ganjam	15
"	" "	Ghazeepore	4	"	"	Pattun	8	"	" 13	Poonamullee	17	"	"	Madras	17
"	"	Muzufferpore	4	"	"	Muttra	3	"	" "	Arcot	17	"	"	Arcot	17
"	Novr 5	Mirzapore	4	"	"	Futtighur	3	"	" 15	Calicut	17	"	June	Masulipatam	14
"	" "	Rewah	9	"	July 3	Jaulnah	13	"	" 16	Walligabad		"	"	Madura	18
"	" "	Bundlecund	3	"	" 5	Ellore	14	"	" "	Manuntoddee near		"	July	Poonamullee	17
"	" 8	Banks of the Sind	3	"	" 9	Cuddapah	17			Cannanore	17	"	Augt	Sankerrydroog	7
"		Bullooah	11	"	" 10	Rajamundry	14	"	" 22	Bangalore	17	"	"	Nellore	17
"		Bahar	5	"	" 10	Masulipatam	14	"	" 29	Quilon	18	"	"	Nagpore	8
"	March	Tipperah	11	"	" 14	Punderpore	13	"	" "	Aleppee	18	"	"	Malwah	8
"	"	Sylhet	11	"	" 18	Ahmednugger	13	"	" "	St Thomas' Mount		"	"	Neemuch	7
"	"	Cuttack	10	"	" 21	Sirroor				in Madras	17	"	"	Saugor	8
"	"	Bandah	4	"	" 25	Hydrabad	13	"	" "	Chittore	17	"	"	Agra	3
"	"	Lohargong	9	"	" 30	Guntoor	14	"	"	Cashar		"	"	Cawnpore	4
"	"	Huttah	9	"	" 30	Secundrabad in Mysore	17	"	"	Maunipore		"	"	Meerut	3

J.H. Madge

Index Map
— OF —
INDIA
Shewing the places chiefly visited by the Epidemic.
Lahore
Delhi
Agra
Allahabad
Benares
Lucknow
Oude
Cawnpore
Patna
Kumaon
Nepaul
Bundlecund
Tirhoot
Gorkha
Khatmandoo
Meerut
Almorah
Bareily
Gwalior
Ajmere
Nagoor
Burrampootur R.
J. H. Madge

TREATISE

ON

THE EPIDEMIC CHOLERA.

PART I.—SECTION I.

HISTORY OF THE CHOLERA.

Cholera (χολερα.) Auct. Græc. Sauv. Cull.—C. ξηρη, Hippocr.—C. arida, Gal.—C. morbus, Auct. var.—C. sicca, Sydenh. Sauv. Aret. Hoff.—C. flatulenta, Menjot.—Trousse galant, Tissot.—C. spasmodica, Curtis.—C. asphyxia, Scot.—Oben und unten purgiren, German.—Mort de Chien, French.—Mordexim, Portuguese.—Hyza, Arabic. Hindoostanee.—Tokhmu, Persian.—Bisoochrau, Sanscrit.—Mirgee, Guzeeratee.—Fural, Mahratta.—Ookhaul Pokhaul, Hindooee.

The term Cholera has been used from the time of Hippocrates. Celsus derives it from χολη, bile, and ῥεω, to flow; literally bile-flux. Trallian traces it from χολας, an intestine, and ῥεω; literally bowel-flux. Dr. Kennedy considers the circumstance of the Greek word for Cholera signifying a spout, to be decisive of the question, that it is derived from χολας, and not from χολη; as the term, not improbably, at first a cant word, is more likely to have been applied from the tubulous form of the intestines, than the secretions they occasionally discharge: precisely as we call the spout of a barrel, by the same term which is applied to the membrum virile; but no one thinks of calling either the one or the other a Gonorrhœa. Further, if the derivation from χολη and ῥεω, were correct, the Greek word, judging from analogous compounds, instead

of χολερα should be χοληρροια, and would have been writtten in Latin Cholerrhœa.

The term Cholera Asphyxia, which is applied by Mr. Scot, has many objections: perhaps not so much so if used as an adjunctive; but Mr. Scot considers it in a general sense. The analogical reasoning, therefore, with respect to therapeutics, might lead the practitioner into errors of prescription. I agree with Mr. Scot, that the generic term Cholera being consecrated by universal and almost immemorial use, it would not perhaps be proper to reject it, even could we propose another demonstrably better; or prove satisfactorily, that bile, either in its quantity, or quality, has no connection whatever with the cause of the disease.

Celsus observes*: " A visceribus ad intestina veniendum est, quæ sunt et acutis et longis morbis obnoxia. Primoque, facienda mentio est Choleræ; quia commune id stomachi atque intestinorum vitium videri potest; nam simul et dejectio et vomitus est: præterque hæc, inflatio est, intestina torquentur, bilis supra infraque erumpit, primum aquæ similis, deinde ut in ea recens caro lota esse videatur, interdum alba, nonnunquam nigra, vel varia; ergo *eo nomine* morbum hunc χολεραν Græci nominarunt."

This destructive Epidemic has been known from the remotest period of antiquity; and is accurately described by Aretæus and Paulus Ægineta. Aretæus observes†, " that Cholera is a most acute disorder, having matter congested in the gullet and upper part of the stomach, which is ejected by vomiting, while all that had been swimming in the stomach and intestines is passed down." He also states, " that the fluids pass by the mouth, and are at first like water; then, by the anus, stercoreous liquid:" adding, " that constrictions of the œsophagus and cardia, and violent pain of the abdomen supervene; contraction of the sinews, and cramping of the muscles, both of the arms and legs; while the fingers and toes twist, the nails grow blue, the extremities cold, covered with sweat."

We have another description by Cœlius Aurelianus‡ equally faithful. He states it to be attended with " torment of the bowels,

* A. C. Celsi Medicinæ, lib. iv. cap. xi.

† Lib. ii. cap. v. ‡ Lib. iii. cap. xx.

looseness, oppression of the præcordia; vomiting of humour and yellow bile; succeeded by matter somewhat resembling the white of an egg; also great heat, insatiable thirst, tension of the sinews and calves of the legs and arms; præcordia drawn upwards, with pain like that of the iliac passion; the countenance being collapsed and the eyes red."

Avicenna* also mentions watery vomiting and purging, with spasms, as symptomatic of this disease; and he is followed by several hundred Asiatic writers. It is also described at length by Bontius, a Dutch physician, who wrote in 1629, at Batavia.

Sydenham's description is however most accurate:—" Morbus hic, qui, ut antea diximus, anno 1669, se latius diffuderat, quam alio quovis anno, quantum ego observaveram eam anni partem quæ æstatem fugientem atque autumnum imminentem complectitur, unice ac eadem prorsus fide, qua veris primordia hirudines aut insequentis tempestatis fervorem cucullus, amare consuevit; qui ab ingluvie ac crapula nullo temporis discrimine passim excitatur affectus, ratione symptomatum non absimilis, nec eandum curationis methodum respuens, tamen alterius est subsellii. Malum ipsum facile cognoscitur: adsunt enim vomitus enormes, ac pravorum humorum cum maxima difficultate et angustia alvum dejectio, cardialgia, sitis; pulsus celer ac frequens, cum æstu et anxietate, non raro etiam parvus et inæqualis, insuper et nausea molestissima, sudor interdum diaphoreticus, crurum et brachiorum contractura, animi deliquium, partium extremarum frigiditas, cum aliis notæ symptomatibus, quæ astantes magnopere perterrefaciant, atque etiam angusto viginti quatuor horarum spatio ægrum interimant." In a letter to Dr. Brady, describing the Epidemic of 1674, 5, and 6, he observes: " Exeunte æstate Cholera Morbus epidemice jam sæviebat, et insueto tempestatis calore evectus, atrociora convulsionum symptomata, eaque diuturniora secum trahebat quam mihi prius unquam videri contigerat. Neque enim solum abdomen, uti alias in hoc malo, sed universi jam corporis musculi, brachiorum crurumque præ reliquis spasmis tentabantur dirissimis, ita ut æger e lecto subinde exiliret, si forte extenso quaquaversum corpore eorum vim posset eludere."

* Pages 492 and 502. Edit. Rome, 1593,

Mr. Scot, Secretary to the Medical Board at Madras, states, that the Epidemic Cholera, according to medical records, raged both among Europeans and natives, during the years 1769 and 1770. Dr. Paisley, in a letter addressed to Mr. Curtis, observes, that the true Cholera Morbus raged at Madras in 1774. This physician says, "It is often epidemic among the blacks, whom it destroys quickly, as their relaxed habits cannot support the effects of sudden evacuations. There is also sudden prostration of strength, and spasms over the whole surface of the body, in relaxed habits; when the pulse sinks suddenly, and brings on immediate danger." Dr. Burke writes of an Epidemic, similar to this, which raged at the island of Mauritius, in 1775, causing great mortality. It likewise appeared in a division of Bengal Artillery, under the command of Colonel Pearse, in the spring of 1781, as they were proceeding to join Sir Eyre Coote's army. It would seem that it had also prevailed in the Northern *Concans*, and assailed the troops with almost inconceivable fury; as men, previously in perfect health, suddenly expired, and those less affected were generally dead or past recovery within an hour. The spasms of the extremities and body were dreadful; while distressing vomiting and purging were seen in every case. Besides those who died, above five hundred were admitted into hospital during one day. It soon appeared in Calcutta, and afterwards, according to report, existed in a northern direction.

Curtis states, that the disease under the appellation of "Mort de Chien," or cramp, existed epidemically in various parts of India, especially at Vellore, during 1787 and 1789. "Frequently," says he, "the spasms attend the first attack, though sometimes they only appear as the disease advances, and then generally affect the lower extremities, afterwards the abdominal muscles; when the whole system becomes convulsed; cold sweats and a pallid hue overspread the body; the countenance turns ghastly, the eyes sink, and the voice is scarcely to be heard; with great dejection of the whole system."

The disease again broke out with great violence among a detachment of Bengal troops, under Colonel Cockerell, marching for Seringapatam, in the spring of 1790. It also raged at Travancore, and the ceded districts adjacent, about the same period.

Dr. Johnson reports having seen some spasmodic cases of the disease, in about 1804; but there are no records to show that it was epidemic at this period, and a lapse of many years takes place before the disease is again heard of as such. Dr. Wyllie states, that in 1814 he observed it; and Mr. Duncan, as well as Mr. Cruickshanks mentions, that it appeared in a brigade of troops, which marched from Jaulnah on the 29th May, 1814; that the skin of the sufferers was cold and livid, with perspiration; the extremities were shrivelled and cramped; the eyes sunk, fixed, and glassy; and the pulse not to be felt.

The next appearance of the disease is in May, 1817, at Nuddea and Kishnagur. In June it was discovered at Mymensing, and at several villages along the course of the Barrampooter. In July it appeared at Patna, and at Sunegong, a town on the banks of a branch of the great river Megna; also in eight divisions of the district of Kishnagur; and on the 19th August, it raged with destructive violence at Jessore. So little was the nature of the Epidemic known, on its first appearance, that extreme consternation was excited. The civil courts of the district were shut; and a temporary cessation of business of every description ensued. Notwithstanding the numerous emigrations which followed, diminishing greatly the density of the population, to speak as does Mr. Jameson, "such was the energy of the disease in this its first onset, and so fatally destructive was it of human life, that in this district alone, it is reported to have, within the space of a few weeks, cut off more than six thousand of the inhabitants." Very fortunately at this period, that talented, humane, and well-known author, Dr. Robert Tytler, excited the public attention to its destructive ravages; and supposing that the disease had local origin, he ascribed it to a crop of blighted rice. There was much consistency and sound logic in his reasoning, until other statements written separately, and without interchange of knowledge or communication, proved, that more than a month before Jessore had become affected, the disease had begun to prevail epidemically in the distant provinces of Behar and Dacca; appearing also at Calcutta, Dinapore, Nursingunge, Chittagong, Rajashahy, Bhaugulpore, Monghyr, Nattore, and Sylhet. On the 15th September evidences of the disease were at Balasore, Barisaul, Poornea, Dinagepore, and Sylhet, to the

extreme borders of Cuttack; reaching from the mouth of the Ganges nearly as high as its junction with the Jumna. On the 17th it was at Buxar; on the 18th at Chuprah and Ghazcepore; about the latter end of the month at Muzufferpore; on the 5th November at Mirzapore, Rewah, and Bundlecund; and during the 8th, in the centre division of the grand army, encamped on the banks of the Sind; raging with greater violence than in any other part of India. So sudden and so rapid was its daily ravages, that the Marquis of Hastings, who was Commander-in-Chief, alarmed at the mortality of the disease, stated it as his conviction, that if it continued with unabating violence a few days longer, it would be impossible for his late numerous and powerful, but now diminished and weakened force, to maintain their position before the watchful and crafty enemy. One or two of his Lordship's attendant servants sunk suddenly from behind his chair; and the Marquis himself was so apprehensive of dying here, that he had given secret instructions, should the event occur, to be buried in his tent; lest the enemy, hearing of his death, should be encouraged to attack and overcome his crippled troops.

It was here the disease put forth all its strength, and assumed its most deadly and appalling form. I was the first person to observe it. A few doolie bearers were brought to me; and having never seen the disease before, thought the men were in a state of inebriation, for the symptoms seemed to indicate as much. But soon discovering my mistake, I reported the circumstance to the superintending surgeon, and was immediately directed to proceed to the encamping ground of the preceding day.

The officer commanding the rear guard having arrived, and reported that on the whole line of march multitudes were dead and dying, I proceeded, escorted by a strong guard of cavalry; when a scene of the most distressing nature was exhibited: whole families, who in the course of the morning, in perfect health, had accompanied their regiments, before proceeding many miles, were attacked by this disease; and I found them lying dead by the side of tanks and nullahs, to which the craving thirst and burning heat of the stomach and bowels, had driven them, in the hope of removing the agonizing sensation.

On the following day, being the second of its appearance in our camp, the disease burst forth with indescribable violence in every direction. But as it may be supposed from my professional connection with the suffering army, that my observations may have been confined to a particular section of the camp, I think it better to introduce the following account of the extent and mortality of this Epidemic from Mr. Jameson, the compiler of the various Reports which were delivered by the medical officers of that division.

In the section of Mr. Jameson's compilation, which refers particularly to the rise and progress of the disease, he states it to have been unsubjected to those laws of contact and proximity of situation, which had been observed to mark, and retard the course of other pestilences. "It surpassed," says he, "the plague in the width of its range, and outstripped the most fatal diseases hitherto known, in the destructive rapidity of its progress; and the mortality soon became so general as to depress the stoutest spirits. The sick were already so numerous, and still pouring in so rapidly from every quarter, that the medical men, although night and day at their posts, were no longer able to minister to their necessities. The whole camp put on the appearance of an hospital. The noise and bustle, almost inseparable from the intercourse of large bodies of people, had nearly subsided. Nothing was to be seen but individuals anxiously hurrying from one division of the camp to the other, to inquire after the fate of their dead or dying companions; and melancholy groupes of natives bearing the biers of their departed relatives to the river. At length, even this consolation was denied to them; for the mortality latterly became so great, that there was neither time nor hands to carry off the bodies, which were then thrown into neighbouring ravines, and hastily committed to the earth on the spots on which they had expired, and even round the walls of the officers' tents. All business had given way to solicitude for the suffering. Not a smile could be discerned, not a sound heard, except the groans of the dying, and the wailing over the dead. Throughout the night, especially, a gloomy silence, interrupted by the well-known dreadful sounds of poor wretches labouring under the distinguishing symptoms of the disease, universally prevailed. The natives, thinking that their only safety lay in flight, had now begun to

desert in great numbers, and the highways and fields for many miles around were strewed with the bodies of those who had left the camp with the disease upon them, and speedily sunk under its exhausting influence."

To return from this particular statement of the effects of the Cholera, to its general history. In the early part of 1818 we find it raging at Bulloah and Behar; and in March at Tipperah, Sylhet, Cuttack, Bandah, Lohargong, Huttah, Ganjam, and Allahahad. In April it prevailed at Midnapore, Tityra, Goruckpore, Oude, Fyzabad, Lucknow, and other places, situated near the Gogra and Goomtee rivers; also at Cawnpore, Jubbulpore, Bettoor, and Naufghur. In May it was at Ougcin, Thanoor, Mahidpore, Hussingabad, Mottay, and Nagpore; in the Nagpore field force at Goongong, Etawah, Tirhoot, Tiraee, Mullye, Benares, Juanpore, Sultanpore (Oude), Bhaeegpore, Hungunghat, Vizinagram, Vizagapatam, Saugor, Nursinghur, Poohoorah, Bhilsah, and Bhopal. In June it ravaged Nipal, Khatmandoo, Patun, Muttra, and Futtyghur. In July it prevailed at Rajamunty, Ellore, Guntoor, Masulipatam, Secundrabad, Hydrabad, Punderpore, Poonah, Sirroor, Saugor, Jaulnah, Meerut, Saharunpore, Aurungabad, Nusseerabad, Multigaum, and Candeish. In August it raged at Bombay, Chanda, Orgalee, Hoobly, Ahmednuggur, Satara, Kurrah, Chandore, Badamy, Darwar, Jeypore, Hissar, Charmulgooley, Panwel, Salset, Surat, Hansi, Kumaut, and Panniput. In September it occurred at Nellore, Chittledroog, Hurryghur, Soonda, Bellary, and Tannah. In October at Quilon, Calicut, Bangalore, Gooty, Allepy, Tripetty, Poonamalie, Madras, Arcot, St. Thomas' Mount, Wallijabad, and Chittoor; and at the extreme borders of Bengal, Kachar, and Munnipore. In November at Trichinopoly, Coimbetore, Sankery, Droogsolem, Tellichery, Seringapatam, Tanjore, Madura, Vizagapatam, Nagore, Combaconamy, Cuddalore, and the Isle of France. In December it was at Cochin and Cannanore. In January, 1819, it re-appeared at Rajamunty, Combicorum, Nagore, Mangalore, Coimbetore, Trichinopoly, Cochin, Trivandrum, Mauritius, Ceylon, and Jaffernapatam. In February, at Gooty and Cannanore. In March, at Quilon. In April, at Hoobly and Badamy. In May, at Soonda, Ganjam, Madras, and Arcot. In June, at Masulipatam and Madura.

In July, at Poonamalee. In August, at Sankerrydroog and Nellore. In the course of the same year, it appeared at Nagpore, Malwah, Neemuch, Saugor, Agra, Cawnpore, Chunah, and Meerut. Indeed, it raged with greater or less violence over the whole of India; and it could not be said that any one part had been wholly free from the disorder.

The foregoing is a brief outline of the progress of Cholera in India to 1820. I now proceed to give the substance of the subsequent Reports, which have been so ably arranged by Mr. Scot; and do this for the more especial information of such of my readers who may desire minute intelligence of its progress and effects, from which they may be enabled to judge whether it be contagious or not.

The dates and local progress of the disease in the territories of Madras, Mr. Scot has examined with attention; paying due regard to the authority and credibility of the numerous Reports which he consulted. And, for the convenience of geographical reference, he has successively traced its appearance in the eastern, middle, and western districts; and from the northern to the southern extremity of what is called the peninsula. In these territories, it first appeared in the district of Ganjam. The magistrate of that place, in a letter, dated 20th March, 1818, states, that the inhabitants had suffered severely from Fever and Cholera. It was not prevalent however in every part of that district; but was frequent at Aska, from the 23rd April until the 16th May, when it suddenly disappeared, and again manifested itself in the beginning of July; and during the month prevailed more generally than it had formerly done. After November, only a few cases were seen in the Ganjam district; although the disease was then, and for a year afterwards, prevalent in the contiguous district of Vizagapatam. Fever continued in several parts of the former district until March, 1819. At Berhampore, Cholera was frequent in September and October, 1820.

Mr. Scot obtained no authentic information regarding the effects of the disease at Chicacole; but it is known, that this place was not exempt from its destructive influence.

No well marked case occurred at Vijanagram until the 20th May; and then, the cases which did occur, continued to be slight until the 26th, when the disease began very generally to prevail

throughout the district. For a month after its commencement, though formidable in appearance, being attended by violent spasms of the whole body, it almost always yielded to the timely application of the appropriate remedies; but during the remaining fortnight, although at first much less alarming, and without evident spasms, it frequently resisted medical treatment, even when applied in the early stage of the disease. After the 5th of July, only a few slight cases occurred. At Vizagapatam, it appeared about the 15th of May. The weather is said to have been then oppressively hot, and the air loaded with humidity. It would seem that few Europeans were attacked after June; but the disease occasionally differed in its prevalence, and in the severity of the symptoms. It continued to be general in Vizagapatam, and the neighbouring country, until February, 1820. It had somewhat declined in December, 1818; but became again very prevalent in March. In May, 1819, a greater number of cases were exhibited than in any other month; but the greatest proportional mortality was in April, of that year. It shewed itself at Rajamundry about the 10th July, began to decline about the beginning of August, and disappeared early in November. It re-appeared at this place on the 25th January, 1819, while an uncommonly cold wind was blowing from the south-east, and it continued to prevail until the end of April. It commenced its attack at Ellore about the 5th of July, in the 1st Regiment of Native Cavalry stationed there, and among the native inhabitants. It was remarked, that the Mussulman families were the greatest sufferers, although the population consisted principally of Hindoos. The greater mortality among the former was ascribed to their obstinacy in refusing proper medical assistance. At Masulipatam, cases first occurred about the 10th of July. The convicts confined in the fort were the subjects of these cases; and indeed, the disease, for some time, appeared only in a bomb-proof apartment, which was low, damp, ill-ventilated, and very crowded; but although these disadvantages were in some measure remedied, it continued to produce a greater number of cases than the other two, which were commodious and comfortable. The disease appeared in the town and neighbourhood about the 20th July, was very prevalent during August, declined rapidly in September, and disappeared early in October, while the

weather was chilly, and the rains heavy. It was nearly confined to the lower classes of the people. It re-appeared at this place about the 15th June, 1819, during extremely hot weather; but the present attack was not so violent, nor of so long continuance as the former. In the several villages situated along the southern bank of the Kristnah river, from the eastern extremity of the *zillah* of Guntoor to the western extremity of the district of Halnand, it seems that it occurred nearly simultaneously, about the end of July; gradually appearing southward, till about the middle of Nov. 1818, when it quitted that part of the country. It commenced about the beginning of the westerly rains, continuing until the termination of the rainy season; and is reported to have been more fatal during the prevalence of bleak westerly winds than at other times; also in the villages situated in the vicinity of tanks than at other places. The banians, or merchants, of the town of Guntoor, who occupy the only wide and dry street in it, almost entirely escaped the disease; while the brahmuns, who inhabit a close and damp street, suffered in as great a proportion as any other class of the people. In the most northerly villages of the *zillah* of Nellore, this disease began to prevail on the 2d August; reaching to the most southern part of it; having appeared at Ongole on the 14th August, and at Nellore on the 20th September. The most elevated parts of the *zillah* are populous, and much frequented by merchants. It is worthy of observation, that the disease was less fatal here, than in the other parts on the whole western frontier, which is near the hills; and in some of the villages there situated, it did not at this time appear. It continued during the rainy season, and entirely quitted the *zillah* before the 15th Jan. 1819; but again became general in the northern parts about the middle of April, 1819, and continued to manifest itself in a southerly direction, appearing at Ongole on the 16th May, and Nellore on the 3rd July. In the Ongole district, it disappeared before the end of August, and in that of Nellore about the end of September. The period of its continuance in any large town or tract of country of these districts scarcely ever exceeded three months. At this time it was more prevalent and much more fatal than last year, and it was especially violent at those places which had previously been exempt from its influence. The weather was

mild and temperate during the whole period of this second attack, with occasional falls of rain.

At Madras, the first case observed by a medical officer, occurred on the 8th October; but it would appear, if the accounts of the natives be true, that some cases had occurred so early as the 5th of that month. It continued to prevail generally in Madras, and the adjacent villages, until the 24th, when it lessened. It very soon, however, increased again, and prevailed with a considerable, though variable degree of violence, until the beginning of November, when it slowly declined, became milder, and in a little time was rare in its occurrence. The poorer classes suffered more from its ravages than those in better circumstances. [A detailed account of the state of the weather here, during its prevalence, will be found in the Meteorological Observations, contained in the next section of this work.] In April, 1819, the troops at the Madras presidency were entirely free of the disease; but it re-appeared early in May, and although not general, it has continued to shew itself occasionally. During the hot months of 1819 and 1821, its attacks were most frequent, since which they have been of more rare occurrence.

It appeared at Poonamallee on the 13th of October, 1818, and without having become very prevalent, seems to have disappeared about the middle of the following month; but many cases again occurred at this place in the middle of July, 1819. It was first seen in Poonamallee and at St. Thomas' Mount; and although not very violent or general, continued long at these stations. It declined considerably in December, and continued to decrease until May, 1819, when it again increased, and during the three months following, it was more prevalent than at any preceding period; but in Sept. it again declined, and early in 1820 became of rare occurrence. It shewed itself at Wallajahbad about the middle of October, and continued to prevail with different degrees of violence in H. M. 86th Regiment, and among the native inhabitants, during November and December. Several cases occurred about the end of April, and a few in the beginning of May, 1819, and became prevalent towards the end of June, especially in H. M. Royal Scots; it then again declined, and soon after disappeared. The Cholera continued to prevail on various parts of the coast; but Mr. Scot had no accurate accounts of the dates of its appearance

or decline, at Sadras, or Pondicherry. It first manifested itself at Cuddalore, about the 14th Nov. after the commencement of the heavy rains, and continued to prevail with considerable violence, till the end of December; when it rapidly declined and soon ceased entirely. At Combaconum, it appeared about the 20th Nov. declined in the middle of December, and soon afterwards terminated. About the middle of January, it was, for two or three days, nearly as prevalent as it had formerly been. It began to prevail at Nagore about the 10th of November, principally among the cast of natives whose occupations obliged them to expose themselves much to the weather, which was then damp and rainy. Negapatam, although distant from Nagore only four miles, continued entirely free from the disease, until the 22nd November. It was much on the decline at both places before the 20th December. At Combaconum, it was again very prevalent for two or three days in the middle of January; and re-appeared at both towns toward the end of July, 1819, continuing prevalent until the middle of August. At Nagore, it again shewed itself about the end of October, and prevailed until the middle of the following month. At Negapatam several cases occurred from the 1st to the 13th of February, 1820.

Having observed those places on the eastern coast, at which the Cholera was more or less felt, Mr. Scot proceeds to give an account of its effects in the various inland stations, occupied by the troops of the Madras presidency.

This disease was experienced by the inhabitants of Nagpoor, and the neighbouring villages, early in May, 1818; but although generally diffused, and productive of great mortality among the citizens, with whom our native soldiery had frequent and intimate intercourse, no case of it appeared in the troops until the 26th or 27th May. At this time, three or four men of the depôt corps were attacked, and died. On the 30th a large detachment of Bengal and Madras troops arrived at Nagpore, from the siege of Chandah, and took possession of the huts near the Seetabuldee hills, which they had formerly occupied. Notwithstanding the excessive heat of the weather, and the laborious duties of the siege, they had hitherto been tolerably healthy, and no cases of Cholera had occurred among them. Scarcely, however, had they

taken possession of their quarters, when it appeared in a very violent form, among the Bengal troops and their attendants. On the 31st May, there were many severe cases among the Madras soldiers ; and the majority of those affected, died on the following day. On the 1st of June, the attacks were very numerous, but the deaths were proportionably much fewer. From the 2nd, it began to decline rapidly, and after the 10thr arely occurred. The European troops at this station suffered but little from the disease. A few of the Madras artillery men, who were attacked, soon recovered: it proved fatal to three or four of the Bengal artillery. At Jaulnah, cases were first observed on the 3rd July, among the families of our native soldiery in the village. On the following day it attacked the troops, both European and native ; and from this time until the 11th, it continued very prevalent. After the latter period, the attacks were milder, and less frequent ; and before the end of July the disease had almost disappeared at the station. It appeared on the 4th July in Lieut. Col. Heath's detachment, encamped in the neighbourhood of Nusseerabad, south of the Taptee river ; also among the inhabitants of the surrounding country.

In Lieut. Col. M'Dowall's camp, near Malligaum, in Candeish, it appeared among the followers, on the 13th July; attacking some men of the Madras European Regiment on the 16th ; from which day to the 23d, the cases in that corps were numerous and violent. After the latter period, the general mortality and frequency of the attacks were diminished; but several severe cases developed themselves during August. The 17th Regiment of Native Infantry, who composed part of the force at Malligaum, entirely escaped the disease. The European Regiment, who were stationed on lower and more confined ground, when the Cholera declined, suffered much from a malignant bilious remitting Fever, which prevailed throughout the corps. In Sir John Malcolm's camp at Mhow, Cholera is incidentally noticed as having attacked part of the force on the 16th July ; but it would seem, from the Bengal reports, to have first appeared there in the course of the month of May. It began to prevail in Punderpoor on the 14th July, while crowded by strangers, congregated at the celebration of some great festival. Here, as at other places, in similar circumstances, the mortality it produced was very great. It commenced its attack on

the troops in the vicinity, on the 17th, and declined about the 24th of the month. In the force encamped near Hoobly, in the Dooab, the first case of this epidemic occurred on the 13th Aug. 1828; and for some days afterwards it was partial, being confined to the camp-followers. It seems to have appeared at Badamee and Darwar nearly at the same time; also at the head-quarters of the Army. It continued to exist among the troops till about the end of September, but was most prevalent from the 18th Aug. till the 1st Sept. The force again experienced a pretty severe attack of it about the middle of April, 1819, when encamped in the neighbourhood of Guddie.

At Bellary, it manifested itself on the 8th of September, 1818; but was partial and confined to the native inhabitants, from the 13th to the end of the month, when its attacks became frequent, both among the European and native troops. It declined about the beginning of October, and disappeared from the European troops on the 5th of that month. About the 20th Oct. it again visited with its former violence, the troops and inhabitants, especially the lower fort, where it was more prevalent than in any place without in the immediate neighbourhood. It did not disappear till toward the end of November. The greater prevalence in the lower fort, has been ascribed to its confined and crowded state; the barracks of the soldiery being surrounded by the huts and houses of the natives. Of five hundred prisoners, in the public jail of Bellary, only one was attacked, and he recovered. The jail is situatedabout twel ve hundred yards from the fort, and is surrounded with a high stone wall. H. M. 34th Regiment commenced its march from Bellary to Bangalore on the 17th of September; no well marked case of Cholera having then occurred in the Regiment. Twenty-eight men of the corps were attacked on the 21st, twenty-four on the 22nd, and twelve on the 23rd, when it began to decline rapidly; and after the 29th no case occurred. Out of 700 soldiers stationed here, 91 were affected with Cholera, and 37 of the number died. It appeared at Hurryghur on the 12th of Sept. 1819, and continued to prevail there, and in the neighbouring villages, till about the end of the month. At Chittledroog the first case was observed about themiddle of September; but until the end of October only a very few slight cases had occurred. From

the 1st to the 15th November the attacks were numerous, and frequently of fatal termination. During the remainder of November, a case or two presented themselves. At Bangalore, a few instances of the disease occurred towards the end of Oct. and during Nov.; but it did not at any time prevail generally. H. M. 69th Regiment commenced its march from Bangalore to Cannanore on the 12th of October; no case of Cholera had then occurred at the former place. On the 20th, while encamped in the vicinity of the Madoor river, two men of a detachment of native soldiers, accompanying the Regiment, were attacked by Cholera; no European however experienced an attack until the 24th. This disease was frequent in the corps from the 28th October until the 13th November. It had been generally rainy since the commencement of the march, and when Cholera appeared, the camp was nightly deluged with rain. The corps arrived at Cannanore on the 18th Nov. From the 12th, when the march was commenced, until the 28th October, Dysentery was the most prevalent disease; but from the latter date, until the 13th Nov. Cholera maintained the ascendancy. After that period, till the 24th Nov., Dysentery was again predominant; but from the 24th until the 3rd of Dec. intermittent Fever, which had previously been rare, was the prevailing disease. No case of Cholera had occurred during the last interval; the intermittent was of the Quotidian type; only two cases of remittent occurred. After the 3rd Dec. Dysentery regained the ascendancy; Hepatitis also became more frequent. About the 6th Nov. 1818, Cholera appeared at Seringapatam, and continued to prevail very generally for a month. No authentic statement of the number of inhabitants who suffered from this disease had been received by Mr. Scot, who states, however, that the mortality must have been much greater here than in any other part of the country. The people, convinced that the disease was a visitation of the displeasure of one of their gods, were more anxious to propitiate the offended deity than to apply for medical aid, which was freely offered to them. They flocked to the temples of their gods, and deluged the altars with the blood of numberless goats, rams, and buffaloes, and having offered the head of the victim, they generally retired to regale themselves with the consecrated carcase. And in many instances, having overcharged their

stomachs with the food, they the same night experienced a fatal attack of the disease. The performance of their superstitious rites subjected them to unusual fatigue, and exposed them to the vicissitudes of the climate, at the season when these were most frequent and most violent. Thesc causes, to which the extraordinary mortality has been ascribed, must have had considerable influence. At Manatoddy, in Wynaad, about thirty cases of Cholera occurred from the 16th to the 22nd Oct. 1818. It was in the district of Coimbatore toward the end of November, 1818, and soon became prevalent and destructive in the villages near the Cavery river; particularly in Errode and Carroor. It attacked Coimbatore on the 30th Nov., declined in Dec. and had almost disappeared by the end of Jan. 1819. Cases secm to have occasionally occurred until Oct. following, when the disease again became very prevalent; but lessened in Nov. and disappeared in Feb. 1820. The Endemic Fever existed at the same time as did the Cholera, and as the latter disappeared the former became general throughout the district. The Fever however seems not to have been severe, a small proportion only of those who were attacked having died.

Mr. Scot next reverts to the northern parts of thc centre of the peninsula. Cholera attacked the Mysore Horse, on the 8th of July, while on thc bank of the Godavery river, on their route to Hydrabad; and it continued to prevail in the corps until towards the end of the month. It appeared at Hydrabad in July, but was not so prcvalent nor so violent here, as at most other stations. The cantonment enjoyed an immunity for many days after the disease had prevailed at the Prcsidency, distant about five miles; and those first attacked were soldiers, who had rcturncd from duty at the Presidency. It cxistcd several days in the market place, called Begum-bazar, bcfore it appeared in the city of Hydrabad. Many cascs occurred in the cantonmcnt at diffcrent pcriods, subsequently to this attack; but thc discase did not bccome gencral. Few cascs occurred in the nativc corps stationed at this placc, and H. M. 30th Rcgt. which was in barracks about half a mile to the right, cntircly escaped thc discase. Thc detachment which had marched from Madras, was attacked with Cholera at the river Kristnah, aftcr exposurc to a scvere storm of wind and rain; and it continued to affect them on the route to Secundrabad. It first

appeared at Gooty on the 6th of Oct. 1818, and cases occurred occasionally until the beginning of Feb. 1819; it does not seem, however, to have been then prevalent there. The 2nd Battalion of the 16th Regt. N. I. stationed at Gooty, as well as the inhabitants of the place, experienced a very fatal attack of Cholera in Feb. 1820. It appeared on the 2nd of the month, and continued prevalent for eighteen days; then declined, and was of rare occurrence after the end of the month. Early in March, however, it began to affect the inhabitants of the neighbouring villages. Of one hundred and one cases, among the men of the 2nd Battalion 16th Regiment, admitted into Hospital during Feb. seventy-five terminated fatally. It first manifested itself at Cuddapah, on the 9th Oct.; but it does not appear to have become general. It appeared at Tripetty on the 1st Oct. during a festival, and soon carried off a considerable number of victims. At Chitore it shewed itself early in Oct. and was said to have prevailed for some time in the district. The first case of Cholera observed at Vellore, was on the 3rd of Oct.; but very few were affected before the 18th of that month; from the latter period of which, till towards the end of Dec. its attacks were numerous. It does not, however, appear to have been nearly so prevalent here as at the neighbouring stations of Chitore and Arcot. About the 13th Oct. it appeared at Arcot, and was generally prevalent until the 23rd. when it suffered a slight remission; for although it continued during the remainder of that and the following month, the attacks were not so numerous or severe, as during the preceding period. The disease re-appeared at Arcot about the beginning of May, 1819, and shortly afterwards at Vellore and Chitore; but it does not seem to have been general, and its attacks ceased about the beginning of July. It occurred at the Barahmaul and Salem districts, from the north-west, about the middle of November, and at an early period destroyed many of the inhabitants dwelling in the various villages on the banks of the Cavery. It shewed itself at Sankerrydroog on the 19th Nov. and began to decline about the beginning of Dec.: on the 22nd Nov. it appeared at Salem. Here, as at other places, it first prevailed among the poorest and most destitute class of the people. It continued very general until the 14th Dec.; but after that period, it declined rapid-

ly, and before the end of the month, cases were rarely seen. Of the prisoners in the jail, who were exempted from their usual labour and exposure during the prevalence of the disease, only nineteen were attacked, and of these only two died. It re-appeared, in a moderated degree, at Salem and Sankerrydroog, towards the end of August, 1819. The first case of Cholera observed at Trichinopoly, was about the end of Oct. in a company of native soldiers. Two men of the company had died of Cholera during the march, and another man who was attacked, died soon after his arrival at Trichinopoly, on the 1st Nov. There was also one fatal case in the village of Pootoor. On the 5th, several persons, especially among the washermen families, were attacked in the villages of Warriore and Pootoor; and some of them died before assistance could be procured. At the same time, a few instances of Cholera occurred on the outside of the north-west gate of the fort, towards the river; and from that period the number of cases daily increased. On the 9th, it manifested itself in the barracks of the European pensioners and native veteran battalion, situated in the immediate vicinity of the river-gate of the fort; on the 13th in the artillery barracks, situated on high ground southward of the fort; and on the night of the 16th, in the barracks of H. M. 53rd Regt. situated on elevated ground at the south-west side of the cantonment. It continued to prevail until the 20th, but after the 22nd it sensibly diminished, and soon afterwards rapidly disappeared. In the middle of Jan. 1819, it recurred in a moderated degree, continuing only two or three days. Many cases were reported to have happened among the native inhabitants of the town and neighbouring country, in July, 1819, and in some parts of the district during Aug. and Sept. The disease shewed itself again at this place, about the middle of Nov. and prevailed to a considerable extent, in the early part of Dec. 1819.

Tanjore and its neighbourhood were affected with Cholera on the 20th Nov. and it soon become frequent in its occurrence, increasing irregularly during Dec. It attained its acme about the middle of Jan. 1819, and shortly after declined; but its decrease seems to have been slow and variable, and it did not disappear until April, 1820. It was seen at Madura, and the adjacent districts of Dindigul and Rammed, towards the end of

Nov. and continued to be general in some districts until March or April, 1821. At several places it had declined and almost disappeared, but returned without any evident cause. It was extended and destructive over the whole of the Madura districts, in the month of June, 1819. In Madura and Dindigul, the Endemic Fever prevailed to a great extent, at the same time with the Cholera. Palamcottah suffered from Cholera in the beginning of Jan. 1819, which declined considerably before the end of that month. It disappeared from the inhabitants and troops previously stationed there, early in Feb.; but the 1st Battalion 15th Regt. which had returned from Ceylon, continued to suffer from it till near the end of that month. It was some time afterwards reported by natives that the disease prevailed in different parts of the surrounding country; but no cases were again observed at Palamcottah until early in Sept. when many persons were affected with it; also in Dec. 1819, and in Jan. and the latter end of April, 1820. It prevailed to a considerable extent in the town of Tinnevelly, in April, 1820.

After the foregoing historic statement of the Epidemic in the eastern and interior territories, Mr. Scot next adverts to its appearance on the Malabar Coast. It prevailed at Hullyhaul and Soonda, early in September, 1818, and continued there for several weeks. These places are situated to the west and south of Drawar, where it has been seen, the disease was prevalent during the latter part of August. Some cases occurred at Mangalore, especially among the prisoners, from the commencement of Sept. to the 20th; but the disease did not then become general. It recurred with considerable severity on the 8th Nov. not disappearing until the end of Jan. 1819. It re-appeared in March, 1820, at the frontier town of Soonda, and in June at Mangalore. The symptoms were extremely violent, and in many instances death ensued in two hours from the first attack. The mortality was great, and the terrified inhabitants abandoned their villages and fled to the jungles. Cases were first seen at Cannanore on the 5th Dec.; it soon became prevalent in the town, and afterward in the neighbouring villages. In the former, it began to decline about the 14th, and in the latter, a few days afterwards. It seems to have disappeared before the end of the month; at most, only a few partial cases oc-

curred after that time. The residents in the fort, during the prevalence of the disease, were unaffected. On the 10th Feb. 1819, the prisoners in the jail were unexpectedly attacked, and in the course of the seven following days twenty-nine of these people suffered from it, when the disease disappeared. In the middle of Nov. a great alarm was created among the inhabitants of Tellichery, by the exaggerated accounts of the mortality produced by the Cholera at Mangalore. In H. M. 69th Regt. then approaching Cannanore, very few cases occurred until the 25th November. During December it prevailed to a considerable extent, among the poorer classes of the people, especially the beggars and fishermen of the lower order; of these, the aged and dissolute were the greatest sufferers. Cholera prevailed over the different districts of the province of Calicut in October. At Calicut, two cases had occurred in May; but it would seem, that no more were observed there till the middle of Oct. Towards the end of Dec. its symptoms, which had hitherto been moderate, became much aggravated, and its attacks more frequent. The prisoners and police corps were among the sufferers. It declined considerably in Feb. 1819; but continued to exist, generally, in a less prevalent degree, in some districts of the province, until Oct. following. In July and Aug. it was more prevalent and violent than during the interval which had elapsed since the commencement of its decline. The poorest of the people, who suffered great privations, were chiefly its victims. It appeared in the neighbourhood of Cochin, on the 8th Dec. and immediately became general. It declined towards the end of the month, and nearly disappeared early in Jan. 1819: some partial cases occurred among the soldiery in March, April, May, and July. It seems that several slight cases occurred at Allepey, early in Oct. and that the disease became prevalent there in the beginning of Nov. and several cases appeared in July following. At Quilon, it began to shew itself from the end of Oct. to the middle of Nov. when it declined, and soon after disappeared, without having prevailed to any considerable extent. Only four Europeans were attacked, although an European Regt. and a detachment of Artillery were stationed at the place. Some troops on their march from Palamcottah to Quilon, in Jan. and March, 1819, experienced a visitation of the disease. In July and Aug. following, many cases occurred in the

89th Regiment, and among the native inhabitants. It was reported to prevail in the northern province of Travancore nearly at the same periods at which it visited Quilon. It manifested itself at Trevandrum, about the middle of Jan. 1819. Slight cases had been frequent there in May, 1818, and a few had also occurred towards the end of Aug. and early in Sept. A report of its prevalence at different places in the southern part of Travancore, was made during the first half of 1819; but, as the veracity of these depended on natives, no correct estimate of its violence or prevalence can be formed. The disease appeared on the coast near Cuddalore, in Jan. 1821, and at Royacottah in Feb.; but it did not continue long at these places, and caused very little mischief. It was felt in the lines of the 2d Regiment Light Cavalry, stationed at Kulladghee in the Dooab, on the 1st of June; and continued to prevail amongst the men and followers, till the middle of the month. The disease was characterized by rapid depression of the powers of life, and the proportionate mortality was great, 28 men having died out of 78 who were attacked. At the same period, Cholera was seen in the village of Bagricottah, about 12 miles distant. It subsequently appeared there in the beginning of Aug. attacking the 2nd Battalion 19th Regt.: 21 cases only occurred, of which 6 proved fatal, in June. The corps of Darwar also suffered an attack; 28 cases occurred, of which 15 proved fatal. The disease prevailed to a considerable extent in the district of Canara, in the months of July and Aug. and the mortality was again very great in proportion to the numbers attacked; the northern parts of that district appear indeed to have suffered in an uncommon degree, both from the frequency and the virulence of the attacks of Cholera. It continued to occur, from time to time, at almost every station under the Madras Presidency during the year 1821: but the cases were by no means generally numerous, at any one period; nor, with the exceptions already given, and those of marching corps, could it be considered to have assumed the form of an epidemic. The cases were most numerous in the southern division, especially at Salem, Sankerrydroog, and Madura, where Fevers were also prevalent. It appeared at Salem, with considerable severity, in Jan. 1822. Two cases had previously occurred on the 28th Dec., and on the 5th Jan. the prisoners in

the jail suffered much from its influence : 64 were taken ill, and 36 died. It disappeared on the 22d. Between 200 and 300 of the inhabitants of the town are stated to have suffered attacks of the disease, of whom a great number perished. It appeared also in Jan. at Samulcottah, first attacking the sepoys of the 1st Battalion 21st Regiment Native Infantry, with their families, and then the inhabitants of the town. In the beginning of March, Cholera exercised its power among a multitude of people assembled at Tutocoreen for the annual pearl fishery. It is stated that upwards of 100,000 persons were collected on this occasion; many of whom were travellers from distant parts, most of them exceedingly poor, and badly fed ; miserably accommodated in temporary huts, exposed to great heat during the day, and to heavy dews at night. It disappeared in April.

Upon the whole, Cholera was less prevalent during the year 1822, than in 1821. At many stations, several months passed consecutively without a single case having occurred ; and if we except some particular places, with the camps of marching corps, it might be said to have nearly disappeared. The particular places referred to are Arcot, Wallajahbad, Salem, Sankerrydroog, Trichinopoly, Madura, and Calicut ; which continued, from the first appearance of Cholera, to exhibit a greater number of insulated attacks, than any of the other stations.

In drawing up the narrative of the Epidemic Cholera in the peninsula, Mr. Scot found it impracticable to give a particular account of those attacks which various marching Regiments are understood to have experienced, during the years 1818, 1819, and the early part of 1820, as the materials on record in Mr. Scot's office, respecting them, were extremely scanty and defective. During these years, accordingly, the narrative relates almost exclusively to the occurrences of Cholera amongst the civil inhabitants and the soldiery in quarters. Since the middle of the year 1820, the information respecting corps on the march has been tolerably complete, and as the history of the disease, as it affected moving bodies, presents several striking circumstances, it has been purposely reserved for a separate recital.

It will be interesting to state, as we proceed, the mortality occasioned by Cholera in corps, on the march, antecedent to 1820, for

the purpose of comparing it with that of succeeding years. The 2d Batt. 19th Regiment Native Infantry, marched from Quilon for Bellary, towards the end of Jan. 1819; their route appears to have been by Cochin, Calicut, Tillichery, the Beriah pass, Seringapatam, and Serah. Cholera appeared at the commencement of the march, but not with violence; as during all February there were only 49 cases, of which 6 terminated fatally; it continued to occur moderately until the 19th March, when the corps must have been well advanced through Mysore; on that, and several succeeding days, it broke out with violence; about 140 cases were admitted in March, of which 44 terminated fatally: the disease ceased in that month; there is no account of the sufferings of the camp followers. The 2nd Battalion 23rd Regiment Native Infantry, on its march from Cannanore to Nagpore, experienced a most fatal attack of Cholera, on the road between Gooty and Hydrabad. The corps had reached the former place in the month of November, without a case of the disease; it began almost immediately after that, and 159 died of it by the end of the month. It continued, but in a greatly mitigated degree, through Dec. and 14 men died of it in that month. There is no medical record respecting this corps for the month of Nov. and Dec. 1819, not even the usual sick-returns. It is remarkable, that a considerable detachment from Madras, which followed one or two days march in the rear of this corps, during the period of its greatest suffering, was entirely free from the disease. The 1st Battalion 5th Regiment Native Infantry marched from Quilon on the 25th Nov. 1819, on its route to Bangalore, by the way of Coimbatore and the Guzzlekutty pass. Cholera appeared on the first day of the march; but in a mild shape: only nine cases were admitted from the 25th to the 30th of the month. In the following month it broke out with great severity; but it diminished sensibly after the corps had ascended the table land of Mysore, which it did on the 20th Dec. During that month, 180 cases occurred, of which 83 were fatal. In Jan. 1820, the disease ceased. The 1st Battalion 18th Regiment Native Infantry marched from Madras in Nov. 1819, on the route to Seringapatam. A few cases of Cholera occurred while the corps was below the ghauts; they ascended the table land of Mysore on or about the 20th, after which it became much more

frequent. It continued till December ; but had finally ceased by the end of that month. 74 cases were admitted, and 41 of these terminated fatally.

Cholera was frequent and fatal in the 1st Battalion 16th Regiment Native Infantry, on its march from Hydrabad to Gooty, from the 19th until the end of Jan. 1820. At the latter period the corps had reached Gooty, where it halted for three days ; the disease declined in the beginning of Feb. immediately after the corps left Gooty, and it was of rare occurrence during the remainder of the march to Trichinopoly. It was not attended by pain or evident spasms, nor were the evacuations, either by vomiting or dejection, generally frequent ; but the vital powers were early depressed, and rapidly exhausted. Of 90 men attacked, 49 died. Sixteen cases of a less severe nature had occurred in Dec. on the march between Nagpore and Hydrabad. Fever was frequent, but not severe during Dec. In Jan. and Feb. both Fever and Diarrhœa were as frequent as Cholera, but neither of them in any instance fatal. The 2nd Battalion 8th Regiment Native Infantry on its march from Secundrabad to Madras, arrived on the north bank of the river, about six miles from Cuddapah, on the 16th of May, 1820, having been healthy during the march : this river was so deep as to be with difficulty passable on the 17th ; however, the corps crossed it, and during this day several of the men were attacked with Cholera ; the cases, though not very numerous, were frequently fatal. On the 18th, the march toward Madras was continued. From the 17th to the end of the month, when the disease disappeared, 36 men of the corps were attacked, and of these 20 died. It was estimated, that 150 of the camp-followers had perished during the same period. Cholera did not exist in any of the villages or towns through which the corps had passed between Cuddapah and Madras. A detachment of about 350 Europeans left St. Thomas' Mount towards the end of April, 1820, and notwithstanding the exposure to a most violent storm of wind and rain on the 9th and 10th May, the men continued very healthy, until they came near Cuddapah, on the 19th, when one of the men was attacked with Cholera ; and the disease immediately became frequent and very fatal. From this time until the 11th of June, 47 were attacked, of whom 22 died. The detachment had continued

its march towards Secundrabad. The 2d Battalion 7th Regiment Native Infantry, on its march from Palamcottah to Cannanore, during April and May, experienced a severe attack of Cholera, towards the end of the former month. The disease disappeared before the termination of the march, after having carried off about 90 men of the corps, besides camp-followers, who suffered much. The numbers taken ill with Cholera in April, are not known; but 41 men died in that month, and in May 90 cases were admitted, of which 47 died; making the total loss 8 men. The 1st Battalion 17th Regiment Native Infantry commenced its march from Cannanore to Hydrabad in May, by the route of Seringapatam, Serah, and Bellary. The disease made its appearance in the corps in May, and continued to prevail with some severity during June; but ceased altogether in July, before the end of their march. There appear to have been 330 men taken ill, of whom 82 died; the mortality amongst the camp-followers is not known. The 1st Battalion 19th Regiment of Native Infantry experienced a very fatal attack of Cholera, in the Mysore territory, while on its march from Cannanore to Nagpore, in June 1820. One case occurred on the night of the 14th, at the town Mysore; thirteen the subsequent evening, at Seringapatam; and the disease immediately became general. It continued prevalent till about the end of June, when it suddenly disappeared, nor did it return at any subsequent period of the march. Toward the end of June, out of 920 men, 234 were attacked, and 116 of this number died: the corps had continued its march through Mysore, and on the 1st July had reached Serah. The 2d Battalion 22d Regiment Native Infantry commenced its march from Madras to Bangalore, on the 9th of June 1820, and had prosecuted it in a healthy state until the 29th, when it arrived at Colar. Here the Cholera unexpectedly appeared, and suddenly became general. The corps left Colar the following day, and was detained at Ooscottah from the 3d to the 26th July: the disease began to decline on the 4th July; after the 16th no case presented itself. Of this corps 138 men were attacked, and of that number 74 died. The disease first appeared among the followers, and it was observed, that in the corps it was almost confined to the privates, who were much exposed to the vicissitudes of the weather; and who, from their own imprudence,

had not the means of procuring proper sustenance. The 1st Battalion 7th Regiment Native Infantry marched from Jaulnah on the 5th June, by the route of Hydrabad, Bellary, and Chittledroog, to Mangalore, where it arrived on the 4th of Nov. having had 18 fatal cases of Cholera. After halting nearly a month at Hydrabad, the corps resumed its march, and their medical officer has observed that Cholera existed in the villages on their route, which was the same for the greater part of the distance as that he had followed shortly before, with the 1st Bat. 17th Regt., which had suffered so heavily from this disease. He imputed the present exemption to their not moving off the ground until the sun was fairly up; the men being thus enabled to take some warm food before setting out; and to their being taught to examine their evacuations, and to apply for medicine, whenever these appeared unusually white; this officer, and some others, having conceived, that Cholera was always preceded by a suppression of the secretion or excretion of bile. The 1st Battalion 20th Regiment Native Infantry marched on the 8th of July from Secundrabad, by Gooty, Ooscottah, and Salem, to Palamcottah, where they arrived in the beginning of Nov. This corps commenced its march while Cholera existed in it; but although the disease continued occasionally to appear, from twenty to thirty men being affected by it during the march, it was generally mild, and only one case proved fatal. The 1st Battalion, 22nd Regiment Native Infantry, marched from Hydrabad on the 2nd Aug. and arrived at Masulipatam on the 1st Sept. Cholera appeared shortly after they marched, and continued till the 24th, when it ceased: 69 cases occurred and 19 of these ended unfavourably. The 2nd Battalion 21st Regt. Native Infantry experienced a slight attack of Cholera on the march from Masulipatam to Madras, where it arrived on the 13th Oct. At this period there was no instance of Cholera: the disease afterwards appeared when the route lay near the sea-shore. Only 24 cases took place in the Regiment, of which 3 proved fatal: about 70 followers were attacked, and 11 died.

Cholera was very general and fatal in the 2nd Battalion 20th Regiment Native Infantry, in Oct. 1820, during part of its march from Samulcottah to Hydrabad. From the 17th to the 21st, five cases occurred, and only two during the two following days. It

suddenly became general on the 23rd, and continued prevalent until the 30th, when it quickly declined, and before the 6th of Nov. it had almost ceased. Of about 1,150 men, 200 were attacked, and 73 died. The amount of the loss of camp-followers, which was said to have been very great, could not be exactly ascertained. On the 21st of Oct. the corps was at Sheer Mahomedpett, on the 23rd continued its march thence towards Mungall, and on the 6th of Nov. arrived at Mulkapoor. Previously to the appearance of Cholera the men were very healthy. The 1st Battalion 1st Regiment Native Infantry suffered a severe attack of Cholera in Dec. 1820, on the route from Nagpore to Hydrabad. One case occurred at Hingolee, another at Nandair, and the disease suddenly became frequent on the 9th of December, while the corps was encamped near the small village Erkala, ten miles north of Mudnoor. The ground of encampment was confined and low, but dry, of the kind called cotton soil; situated at the bottom of some rising ground near the village, and in the neighbourhood of some stagnant water. The corps left this place the following day, and continued its march until the 21st, when, the disease continuing very prevalent, it was resolved to halt at Peddapoor, a village situated on high and sandy ground, one march north of Ondole. Having remained here until the 25th, without any diminution of the frequency, or severity of the disease, the corps again proceeded, and on the 30th arrived at Secundrabad. The disease began to decline on the 27th, and no case occurred after the arrival of the corps at the latter station. Of 1010 men, 167 were attacked, and 64 died.

The inhabitants of Erkala, where the corps was first attacked, knew nothing of the disease, nor was it known to have existed any where on the route from Nagpore to Hydrabad, for many months previously. The villages were entirely free from it when the corps was in their neighbourhood; and it was not known to have subsequently appeared in any of them. For sometime before its commencement in the corps, the men being unable to procure wholesome food, were constantly using new, unripe grain, called d'hall, as the principal article of their diet. Slight Quotidians and Diarrhœa were the most frequent diseases previously to the appearance of Cholera; and after it had ceased, the former continued to be the most prevalent complaint. On the 13th, the corps left Secundrabad for

Bellary; but no ease of Cholera occurred on the march. During the year 1820, numerous small detachments, both of European and Native troops, were put in motion, several of which experienced attacks of Cholera.

Mr. Seot has thus recorded numerous instances of eorps on the march, suffering from Cholera during 1820. It will be no less interesting to some readers, to observe the important fact, that under circumstances apparently similar, many regiments escaped entirely, or at least did not suffer more than others did in quarters.

His Majesty's 53rd Regiment marehed from Trichinopoly to Bellary, arriving on the 25th February, 1820, having experieneed but few cases of Cholera, and only one of their number died of it. His Majesty's 34th Regiment marched from Bangalore to Madras, where they arrived in the end of June; two or three cases of the disease oecurred, but none ended fatally. His Majesty's 46th Regiment marehed from Madras on the 1st of July, and arrived at Bellary on the 10th of August, by the route of Cuddapah and Gooty. The corps eontinued generally healthy during the mareh; but having experienced a violent storm on the night of the 15th July, at Balpilly, a small village situated in a deep and extensive jungle, six men were seized with Cholera next day, of whom two died; about five or six of the followers also suffered attacks of the disease, after which no further eases oecurred. The left wing of this Regiment marehed afterwards to Belgaum, where it arrived on the 23d Oetober, and the flank Battalions of Europeans marehed from that plaee to Bangalore, where it arrived on the 30th Deeember, without a ease of Cholera happening in either instance. His Majesty's 53rd Regiment marched again from Bellary on the 12th July, and arrived at Bangalore on the 1st of August: one case of Cholera oecurred, whieh proved fatal. The 2nd Regiment Light Cavalry marched from Jaulnah on the 15th June, along with the 1st Battalion 7th Regiment, already noticed as having suffered considerably between that station and Hydrabad. The Regiment experieneed but very little annoyance from Cholera, although under the same circumstances of exposure as the Battalion of Infantry; and it prosecuted the remainder of the march from Seeundrabad to Kulladghee, in the

Doab, without any case of the disease. The 1st Battalion 21st Regiment Native Infantry, marched from Secundrabad on the 12th Aug. and arrived at Samulcottah on the 21st Sept.; a very few insulated cases of Cholera having occurred. This corps travelled the same route as the 1st Battalion 22nd Regiment Native Infantry, for the first 150 miles, and only ten days later. The 2nd Battalion 9th Regiment Native Infantry marched from Belgaum on the 14th Sept. towards Sattarah, thence retrograded, and pursued its march to Nundidroog, where it arrived on the 28th Dec. without having a case of Cholera, nor was the disease observed in any of the villages on the route. The 2nd Battalion 2nd Regiment Native Infantry marched from Bangalore on the 16th Sept. and arrived at Darwar on the 23rd October, nearly in the same track, and had only one case of Cholera, in a Sepoy, who died, and one in a camp-follower, who recovered. The 1st Regiment Light Cavalry marched from Kulladghee, by the route of Beejapoor, Pundapoor, and Perinda, on the 15th October, towards Jaulnah, where it arrived on the 17th Nov. without having a single case of the disease. The 1st Battalion 10th Regiment Native Infantry marched from Sattarah to Bellary, during the months of November and December, also without having a case of it. The 5th Regiment Light Cavalry likewise accomplished the march from Jaulnah to Sholapoor, during the month of Nov. without a case of the disease.

This closes the narrative for the year 1820. Towards the end of Feb. 1821, the 1st Battalion 8th Regiment N. I. commenced its march from Chittledroog to Nagpore, and, on the 5th April, arrived at Secundrabad. The corps had hitherto been healthy. On the 6th, while encamped here, on low sandy ground, near a tank, two cases of Cholera occurred. No one was attacked on the 7th, but on the 8th, eleven cases presented themselves, when the encampment was removed to higher ground. The disease, however, continued until the 14th, when the corps left Secundrabad. After the 16th, only one case occurred; this station was at that time free from the disease. The weather was exceedingly hot, the thermometer being during the day about 115° in the double-poled tents of the privates. After enjoying an entire immunity for three weeks, a few were again attacked, during the last ten days of the march. The

whole number of sufferers was 58, of which 31 died. The corps reached Nagpore on the 18th of May. The 2nd Battalion 1st Regiment Native Infantry commenced its march from Nagpore to Trichinopoly on the 6th of Feb. 1821, and on the 11th of March arrived at Secundrabad. Fever had been pretty frequent during the early part of the march, but it had now abated very much, and the other diseases being trifling and local, the corps was considered healthy. While encamped at this place, in a small recess among low hills, near a tank, where the 1st Battalion 8th Regiment above-mentioned had also been encamped, the first case of Cholera appeared, on the 19th March, and it soon proved fatal; another fatal case occurred on the following day. On the 21st March, the corps pursued its course, and on the 31st encamped within six miles of the north bank of the river Kristnah. During this interval, cases of Cholera occasionally occurred, and Diarrhœa, which had sometimes appeared previously, was frequent. On the 1st April, the Battalion crossed the river, and encamped on sloping ground, of a black soil, near the village Khatoor. Immediately after crossing the river, many of the followers were attacked with Cholera, and in a few hours it became frequent and violent in the corps. On the following day, the camp was removed to Bycapoor, and pitched on high ground of a clean red soil; the cases were not quite so numerous, though equally severe, as on the preceding day. The corps crossed the river Toomboodra on the 3rd, and encamped on high ground at Kurn, where it remained until the 6th, when it proceeded slowly on its route, and on the 15th arrived at Gooty Anantapoor. Here it remained encamped on sandy, open, elevated ground, until the cessation of the disease. From the 2nd to the 8th, the disease continued at its height; from the 8th to the 15th it progressively declined; but on the 15th, it again became very frequent, though not so violent as formerly; and until the 25th it continued to prevail without any considerable remission. After this period, few severe cases occurred: but the disease did not altogether disappear until the 7th of May. Of about 940 men, 283 were attacked, and 47 died. Diarrhœa became frequent as Cholera declined, and continued so doing the greater part of May. The corps left Gooty on the 19th May, continuing free of the Cho-

lera on the route to Trichinopoly. The 1st Battalion 13th Regiment Native Infantry left Trichinopoly for Gooty on the 5th Feb. and arrived at the latter place on the 13th May. A few cases of Cholera appeared during Feb. which were mild; but in the neighbourhood of Salem, it assumed a more formidable shape, and prevailed during the greater part of March; in April only one case occurred, which was the last they felt during their journey. There were 58 admission in all, and of these 8 died. The 1st Battalion 5th Regiment Native Infantry left Bangalore in March 1821, and continued remarkably healthy on its route to Malligaum in Candeish, until it arrived at Rajoory, between Punderpoor and Ahmednaggur. While encamped at this place, on the 14th of May, Cholera suddenly commenced in a violent degree, and it continued frequent until the 21st; after this period its violence and frequency were much diminished; but it did not disappear until early in June, a few days after the arrival of the corps at Malligaum. Of 95 attacked 47 died. In the middle of March 1821, the 1st Battalion 15th Regiment Native Infantry left Quilon for Hydrabad, its routebeing by Coimbatore, Bangalore, and Gooty. It continued healthy on its route up to the 21st May, when, being encamped near Koodore, a little beyond the northern boundary of Mysore, Cholera suddenly became very frequent. Four cases had previously occurred at long intervals. It began to decline on the 27th, and after the 4th of June, only four cases appeared. Of about 1,090 men, 193 were attacked, and 73 died. The corps had continued to make short marches until the 30th, when it reached Anantapoor. At this place, the sick were comfortably accommodated and recovered rapidly: no case of Cholera occurred on the route hence to Hydrabad. Diarrhœa and Quotidian were the most frequent diseases for some time before the commencement of the attack of Cholera, and Dysentery was unusually frequent for some time after its cessation. The 1st Battalion 12th Regiment marched from Jaulnah for Wallajahbad on the 10th March, and arrived on the 29th May. The route was by Hydrabad, Rachore, Gooty, Cuddapah, and Naggery. This corps experienced no attack of Cholera until after it had passed Gooty early in May, when the disease appeared and affected 65 men, of whom 21 died: it had nearly disappeared when the corps

entered Wallajahbad, and only two or three cases occurred after that. The 2nd Battalion 16th Regiment experienced a severe attack of Cholera on its route from Gooty to Secundrabad. The disease began to appear among the men on the 27th April, three days after they had left Gooty, and continued until the 21st May, within three days march of Secundrabad. Of 122 attacked, 32 died. This was the third time that Cholera had prevailed in the corps. Early in April, 1821, the 1st Battalion 4th Regiment left Berhampore, on its route to Nagpore by Hydrabad. During April and May, a case of Cholera occasionally occurred; but the disease did not become frequent until the 2nd June, when the corps was encamped on dry, elevated ground, at Juggapet, near Mungall. It continued to increase until the 8th, and began to decline on the 10th; after the 15th (on which day the corps arrived at Opal), it was of rare occurrence, and about the 24th it altogether ceased. During its prevalence, the corps was marching through a sterile, parched country, the greater part of it jungly. After the 13th, when the corps arrived at Mulkapoor, the sick were well accommodated. Of about 1,000 men, 170 were attacked, and 57 died. The corps left Hydrabad on the 2d July, and notwithstanding the disadvantage of travelling during the rainy season, it continued healthy all the way to Nagpore. The 6th Regt. of N. C. commenced its march from Nagpore to Arcot, on the 13th May, in a healthy state. On the 19th, at Koomlie, two men were attacked by Cholera; and from this, until the arrival of the corps at Arcot, at the end of July, the disease, though not at any time frequent, occasionally occurred. It was most frequent the week before the Regiment had reached Hydrabad, and the week following. From Nellore to Arcot, it was less frequent than at any former period of the march; no cases in general appear on the halting days, nor was any one attacked during four days occupied in swimming the Kristnah: of 122 attacked, 29 died. The disease was not known to exist any where on the route. On the 17th of May, the 1st Battalion 11th Regiment proceeded from Nagpore, on its route to Ellore, by Hydrabad. Cholera appeared in camp, at Barodah, on the 24th, and became prevalent on the 28th, but began to diminish on the 3rd of June. After the 6th, the disease was rare; but cases appeared at considerable intervals during the remainder of the march. Of 138 attacked,

55 died. It was reported by the inhabitants of Idullabad, a town which the corps passed on the 30th of May, that the disease had lately been prevalent there, but had then almost disappeared. The symptoms were most violent during the first four days, when the cases were not very frequent. On the 21st May, the 1st Battalion 3rd Regiment N. I. left Nagpore for Wallajahbad, by Hydrabad and Nellore. On the 31st, Cholera appeared in the camp at Kyer, continued frequent during June, and cases occasionally occurred till the 27th of July; the corps being at that time, three or four days march south of the river Kristnah. Of 143 attacked, 32 died. The 2d Extra Battalion marched from Trichinopoly on the 2d June, by Madura and Pallamcottah, for Quilon, where it arrived on the 11th July: towards the conclusion of the march, and after entering the confines of Travancore, about 17 cases of Cholera occurred, of which 6 proved fatal. The 2d Battalion 24th Regiment Native Infantry marched from Wallajahbad on the 5th June, by the way of Chitore, Punganore, and Palsamoodrum, reaching Bellary on the 13th July. Cholera made its appearance about the commencement of the march, and continued at intervals till its conclusion; 62 cases occurred, of which 22 terminated fatally.

The 1st Battalion 2d Regiment N. I. marched from Malligaum, in Candeish, early in June, by the route of Poonah, Sattarah, Beejapoor and Bellary, for Bangalore, where it arrived on the 17th October. The greater part of this long march was prosecuted during the south-west monsoon. 74 cases of Cholera occurred, of which 35 proved fatal. The reports are not complete for the early part of the march, and it is not known under what circumstances the disease first appeared; but of the numbers mentioned above, 20 cases occurred, of which 13 were fatal, between Punderpoor and Beejapoor. The 1st Battalion, 16th Regiment N. I. left Trichinopoly in December, by the route of Pallamcottah and Madura, for Quilon, where it arrived on the 22nd Jan. 1822. About the confines of the Travancore country, Cholera appeared in the camp: 17 men were taken ill, of whom 6 died. Nearly at the same time, and on the same route, a large detachment of natives from Quilon to Trichinopoly, had no case of the disease until they approached Pallamcottah. The 2d Battalion 20th Regiment Native Infantry marched from Hydrabad on the 3d Jan. 1821, by the

route of Neermul, and arrived at Nagpore on the 2nd Feb. without having a single case of Cholera. The 5th Extra Battalion moved from Bangalore to Ryacottah in January; and the 2nd Battalion 14th Regiment Native Infantry from Vellore to Chittledroog, in the course of Jan. and Feb., with an equal exemption. The 8th Regiment Light Cavalry marched from Sholapoor to Arcot, where it arrived in Feb. also without any case of the disease. The 2nd Battalion 12th Regiment Native Infantry marched from Bellary on the 29th January, by Adonie and Koolburga, for Jaulnah, where it arrived on the 14th March, and no case of Cholera occurred. The 1st Battalion 24th Regiment N. I. moved from Ellore on the 4th Feb. by Vizianagram and Chicacole, and reached Berhampore on the 14th March, also without a case of disease. The 3rd Regiment Light Cavalry marched from Arcot, on the 12th Feb. for Nagpore, by the route of Cuddapah, Gooty, Hydrabad, and Neermul: some cases of Cholera took place among the camp-followers, of whom five died; but none of the Regiment suffered. The 2nd Battalion 25th Regiment moved from Pallamcottah on the 25th Feb. by the route of Oodagherry and Trivandrum, from Quilon, where it arrived on the 13th March. Eight men of this corps were seized with Cholera during the march, and two of them died. The 2nd Battalion 13th Regiment N. I. marched from Hydrabad on the 13th May, by Ongole, Nellore, and Poonamally, arriving at Trichinopoly on the 7th August. Cholera existed in the corps before the commencement of the march, though in slight degree; two mild cases occurred in the course of the first week, but none during the remainder of the march. The 2nd Battalion 6th Regiment Native Infantry left Hydrabad on the 7th Aug. for Vellore, by nearly the same route of Ongole and Nellore, and reached their destination without having a case of the disease. The 2nd Battalion 15th Regiment N. I. accomplished the march from Malligaum in Candeish, to Masulipatam, without experiencing a case of Cholera: the corps marched on 13th Dec. 1821, by the route of Jaulnah and Secundrabad, and arrived on the 20th Feb. 1822. Although many corps of native troops were under movement in the year 1822, they enjoyed an almost entire exemption from Cholera. The European corps were equally fortunate, with one or two exceptions. One case occurred in the Madras European Regt.

which marched from Nagpore on the 17th January, and arrived at Masulipatam on the 16th of March.

Mr. Scot has hitherto confined this part of his narrative to the notice of marching corps; he then adverts to some very fatal visitations of Cholera, which took place at and near Madras, in the months of May, June, and July, in four of H. M. Regiments. Some of these Regiments were not indeed actually on the march, but they were placed in circumstances differing very little from the fatigue and exposure of a camp life.

His Majesty's 54th Regiment landed at Madras on the 10th of May, from the H. C. Ships *William Fairlie* and *Thomas Coutts*, in a remarkably healthy state, after a voyage of 48 days from the Cape of Good Hope; and were marched into quarters at Fort St. George. Cholera appeared amongst the men within three days after their landing; and it continued till the 7th of June, three days after their moving into camp, on their route to Bangalore. It appeared on the 13th June, but in a greatly mitigated degree, and did not finally cease till the 1st of July, two days after the Regiment marched into quarters at Bangalore. On the 26th of June, four cases occurred; but there were no more until the 30th, when there was one case, which proved to be the last. Of 632 men, 159 were seized with Cholera, of whom 54 died. The European women and children of the Regiment suffered considerably, while very few of the native camp-followers were attacked by the disease. H. M. 34th Regiment moved out of Fort St. George, on the 10th May, into camp at the Mount, where they remained stationary till the 25th. On that day the corps commenced its march to Wallajahbad, which it completed in three days, and went into quarters there on the 27th. Cholera appeared in the camp on the 14th, and prevailed with great severity till the 25th; on which day, being the first of their movement, 9 cases occurred, all very tractable. It then ceased; but on the 1st and 2nd of June, and on the 19th and 20th of that month, several fresh cases took place. Of 836 men, 87 were affected with the disease, of whom 18 died. The Regiment was volunteering during the greater part of the time they lay at the Mount; an occasion which invariably gives rise to excessive drinking, and consequently, to great exposure to the climate: the disease, however, had distinctly broken out before the

volunteering began. The women and children of the 34th Regiment suffered considerably, while but few of the native camp-followers were attacked.

H. M. 53d Regiment marched from Bangalore toward Madras, on the 11th May, by the route of Chitore. The corps was in a remarkably healthy state, not having left a man behind, or having one of their number sick. They reached Palamanair, at the top of the ghauts, on the 20th of May, without accident; but during that, and the succeeding day, two cases of Cholera occurred. On the 22d, they descended the ghauts, and the disease generally increased. The admissions were most numerous from the 27th to the 31st of May. The disease had ceased by the 5th June, on which day the Regiment marched into Fort St. George. Of 871 men, 70 were attacked with Cholera, twenty of whom died. The native camp-followers suffered comparatively little. This Regiment having afterwards moved into camp near Madras, about the middle of July, for the purpose of volunteering into other corps, they, contrary to the experience of the 34th Regiment, entirely escaped Cholera on that occasion. His Majesty's 41st Regiment arrived in two divisions from England, on the 6th and 15th of July, and marched into Fort St. George. The men of the 1st division were almost immediately attacked with Cholera; several of those belonging to the 2nd division were taken ill soon after landing. Of 714 men, 159 suffered an attack of the disease, of whom 32 died. It had almost entirely ceased by the end of the month. It has been stated that the 54th Regiment landed from the Ships *William Fairlie* and *Thomas Coutts*, on the 10th of May. In the former ship, while at anchor in the roads, Cholera made its appearance on or about the 18th of May; and before the close of the month, there were 65 cases, 12 of which proved fatal. The disease did not appear in the *Coutts* till a fortnight afterwards, when 23 cases occurred, of which six were fatal.

The comparative liability to Cholera, and the comparative mortality under its influence, between old and newly arrived Regiments, as exhibited in the instances above-mentioned, may be thus stated: The 34th Regiment had 10½ per cent. of their effective strength taken ill, and the 53rd Regiment had not quite 9 per cent.; the

54th Regiment had 23½ per cent. of their effective strength taken ill, and the 41st Regiment a little more than 22 per cent. The 34th Regiment lost every fifth man taken ill, and the 53d lost every fourth; the 54th Regiment every 3d sufferer, and the 41st every 5th. The four Regiments however were not placed in parallel circumstances, for the 34th and 53d Regiments were under canvas, and one of them was actually marching, while the 41st and 54th Regiment were in quarters, the former during the whole period, and the latter during the greater part of it.

Having given the substance of the various Reports of the ravages of Cholera, on the Madras establishment, I shall now proceed, to describe its further history in Bengal. In its recent attacks, the disease did not develope any new laws, or display itself under any new form; yet, as the appearances of those attacks generally, have tended materially to confirm some, and to overthrow others, of the inferences respecting the peculiar habits of the disorder, which Mr. Jameson ventured to draw on the strength of former experience, and further to establish the efficacy of particular modes of treatment, it will be necessary, at the risk of tediousness, to give some account of them. In doing so, however, it shall be my endeavour to expunge such matter as I deem to be irrelevant and unnecessary.

In the spring of the year 1819, the Epidemic raged extensively in Nagpore and Malwah; and largely affected the Nerbudda Field Force, and the several Detachments serving under Colonel Ludlow, in the vicinity of Neemuch, in April and May. On the 8th of the latter month, it reached the Saugor Division of the Army, became violent on the 18th, declined towards the end of the month, and finally ceased on the 4th of June. The natives alone were affected. Sixty-four persons were admitted; of whom 19 died. The men of the 1st Battalion 26th Native Infantry, who had previously suffered much from Fever and Dysentery, and had impaired their constitutions by remaining long in the Hospital, were chiefly affected. It had 54 admissions, and 18 deaths, from a strength of 868. On the 21st, it buried six men. The corps was with the Left Division on its being attacked during April of the preceding year, and had then 8 cases, and 2 deaths; but the 2nd Battalion 28th Regiment, which on that occasion had 56

cases and 29 deaths, now wholly escaped. So the 2nd Rohilla Cavalry, which had likewise been attacked, when with the Rajpootana Force in September, did not lose a man from the strength of 1125, although encamped close to the 26th Regiment.

The disease next re-appeared in the Rajpootana Force. It shewed itself mildly on the 8th of June in the Rampoora Local Battalion; but did not affect any other corps till the 20th, when it became general. The attack was upon the whole a mild one. Excepting one officer, who unfortunately sunk from debility and relapse in a late stage of the disorder, the Europeans remained wholly exempt; and from a native force of 9,738 men, there were during the month 106 admissions, and 25 deaths. The mortality fell chiefly upon the 2nd Battalion 7th Native Infantry, then affected for the first time, and on a detachment of 340 recruits: the former having 18 admissions, and 6 deaths; and the latter 57 admissions, and 8 deaths. The remaining casualties were shared by the other corps. But the 1st Battalion 28th Native Infantry, and 5 companies of the 1st Battalion 27th Native Infantry, both of which had suffered severely in the preceding September, now wholly escaped; and only a few cases, all terminating favorably, occurred in the 2nd Battalion 19th Native Infantry, which lost many men at Mundessore, in August. In one division of the 27th Native Infantry, there were 7 admissions, and 5 deaths; but all these took place in persons who had been absent from the corps during the sickly period of September. Some cases appeared in a detachment of the 2nd Battalion 7th Native Infantry, on duty in the garrison of Jaragurh, at a thousand feet above the plain; while the inhabitants of the town of Ajmeer, on the declivity and at the base of the hill, escaped. The disease still continued to prevail in the Division, though with gradually declining violence, during the beginning and middle of July; but entirely ceased on the 20th of that month. The number of admissions during the month was 70, and of deaths 20. The 2nd Battalion 7th, and 1st Battalion 19th, each lost 7 men. Several Europeans were likewise affected, and 2 officers, 3 privates, and 1 woman were cut off. The Nerbudda Force suffered considerably. Thus the 1st Battalion 8th Native Infantry had 40 cases, and 9 deaths; and the 1st Battalion 15th Native Infantry, 13 cases, and 5 deaths. Both of

these corps had been previously exposed ; but we have no particulars regarding the description of men now affected. From this month downwards, the disease ceased to be epidemic, equally in the Nerbudda, Saugor, and Rajpootana Divisions ; and gradually gave place to Fevers, and other complaints common to the climate and season.

The Epidemic made its second appearance at Agra on the 27th May, was very destructive during the first week of June, abated about the 10th of that month, and wholly withdrew on 15th. Its range in cantonments was comparatively limited, and chiefly confined to the 1st Battalion 7th Native Infantry, which had 36 cases, and 15 deaths. The total number affected was 3 Europeans and 39 natives, of whom 17 died. There were likewise 4 deaths in the jail. The disease appeared at Muttra in the end of June, and there exerted its influence in a slight degree throughout the whole of the succeeding month. It could scarcely, however, be said to be epidemic, as only 29 cases, and 7 deaths, occurred in the Infantry lines, and not one in the Cavalry corps, or in the town. Thus Agra, which in the former year had nearly escaped, was now severely visited; whilst Muttra, then dreadfully scourged, now remained wholly unaffected. During this period, Mynpooree and Futtihgur were quite healthy ; and at Coel the disease scarcely appeared. Not a single case offered in the town, or jails ; and although no less than fourteen Sepoys, labouring under the disorder, were received into the Battalion Hospital, from a party which had returned from Agra, two cases only occured in cantonments, and both of these nearly a month subsequently to the arrival of the affected party.

Sporadick cases had been very frequent among the Europeans, especially the drunkards, at Meerut ; it appearing that the disease recurred in an epidemical shape. On the 9th of that month, it appeared in the Bazar of his Majesty's 14th Regiment of Foot, and ceased there after carrying off 40 out of 50 attacked*. Moohummudans and Hindoos suffered equally ; and among the latter, three persons who were understood to have had the disease in August of the former year. This bazar is a remarkably confined and noisome

* The numbers attacked were probably under-rated.

place in the centre of the cantonment. On the 12th, the disease appeared in the town, in which, between the time of its first appearance and in the end of the month when it wholly disappeared, it killed, according to the Police reports, 70 out of an unknown number attacked. On the 28th, it entered the bazar of His Majesty's 8th Dragoons; and, after destroying 14 persons, (10 Mussulmen and 4 Hindoos,) withdrew on the 17th Sept. Many cases, but of a milder type, at the same time occurred in the bazar of the Native Battalion; and some of these secondary attacks in the preceding season. In the Sudder Bazar, which during the first visitation had suffered more severely than any other spot, a few cases only occurred now, and those few generally mild, although through neglect more than one half proved fatal.

Mr. Jameson next comes to its effects upon the troops; and as there was here something very remarkable in the great fatality, and partial distribution of its attacks, it will be necessary to enter somewhat more largely into particulars, than the concise nature of these remarks may perhaps well admit. The total strength of the force in cantonments was 2,364 Europeans and 1,342 natives. It was composed of His Majesty's 8th Light Dragoons, His Majesty's 14th Regiment of the Horse Brigade, the 1st Battalion 25th Regiment Native Infantry, a Detachment of the Provincial Battalion, and the Gun Lascars of the Horse Brigade. Part of the Horse Brigade had suffered severely with the centre division in 1817, and slightly in 1818. Of the other corps, His Majesty's 8th Dragoons had had 7 cases and 2 deaths, at Meerut, in August, 1818; His Majesty's 14th Regiment 3 seizures and 1 death; and the Provincial Battalion had remained free. On the present occasion, the 8th Dragoons had only eleven cases and two deaths; whilst the Horse Brigade, the 25th Native Infantry, the Provincial Battalion, the Gun Lascars of the Horse Brigade, and all the officers, entirely escaped; so that nearly the whole force of the disease appeared in the 14th Regiment.

On the 8th of August, the first case of Cholera appeared in the 14th Regiment, which, including invalids and convalescents, had then 200 sick in Hospital, from other complaints. On the 12th, two cases occurred; on the 13th and 14th, about 10 were brought

in. On the 15th, the morning was more sultry than any in the month. Eight hundred men of the Regiment went to church in the Dragoons' lines. Some were attacked in church; some on the march back; and some in the barracks after breakfasting heartily. Several were dead before night; when no fresh cases occurred, and the symptoms of such of those already affected as were not too far gone became less severe. On the 17th and 18th, the men came in so fast that the hospital got exceedingly crowded; and it became necessary to accommodate the fresh cases in the school-room, and the convalescents in an empty barrack in the Dragoon lines In the day of the 19th, there were fresh admissions: but in the night they were more numerous than ever. The pestilence was at its height on the 20th; and many men were brought in, past hope of recovery, all vital energy being from the commencement nearly extinguished. Many invalids in hospital were now seized, and being much debilitated by previous disease, sunk almost without an effort. On the morning of the 21st, the disorder declined quickly, and soon after entirely disappeared. Two slight cases occurred in the succeeding night, and one or two next day.

During the whole period of its present visit, the Cholera in this Regiment attacked 221, and cut off 41 persons, from a body of 1,200 rank and file: the seizures being as one in five and a half of the whole corps; and the deaths nearly in like proportion to the seized. Some relapses occurred and terminated fatally.

Nearly at the same time when it broke out at Meerut, the Epidemic displayed itself in Kumaoon, at Bareilly, and at Moradabad, to the east, and at Kurnaul to the west. It appeared at Almorah on the 10th of August; and disappeared about the middle of September. It was confined to the suburbs in the south-east angle of the town, which were inhabited by persons of the lowest casts only; and did not fairly enter the Sepoy Lines, or the body of the town. The disease was comparatively mild and easily checked. Twelve deaths only took place from 76 seizures. One Sepoy only of the 13th Native Infantry was seized, and even he got the disease when in the infected part of the town. Few instances occurred of more than one of a single family being affected. The disease appeared on the east bank of the river Kalee to Al-

mora, and thence at Kassipoor to the west. We have no note of the effects produced by the disease at Bareilly. The mortality could not, however, be great; since the jails in the quarter from July to Oct. gave only nine admissions and three deaths. At Moradabad it was more deadly. During the month, the deaths in the town were from twelve to sixteen daily. In the jails, out of 700 persons, there were only four admissions and two deaths.

The disorder shewed itself at Kurnaul on the 10th of August, and wholly disappeared in September. It attacked the 2nd Battalion 26th Native Infantry first, and most severely. It had 10 cases and 5 deaths. Part only of this Battalion was with the Hansi Division, in August of the former year; the whole was now present. The 2nd Battalion 5th Native Infantry had 9 cases and 7 deaths; and the 6th Regiment of Cavalry 2 admissions and no death. Immediately upon the appearance of the disease, all the corps were ordered to wear warm clothing. From Kurnaul the disease spread in the direction of Loodheeana, but, as in the former year, died away before reaching that station. Delhi, and every other station coming within the division, now kept healthy; so that the only place visited was Kurnaul, which had escaped on the former occasion.

After visiting Meerut, it re-appeared at Saharunpore, attacking first the town and then the cantonment. Neither in number, nor in violence, however, did the cases equal those of Sept. and Oct. of the former year. There were only 14 cases and 4 deaths in the Provincial and Nussurec Battalions, and in the jails only one case, and no death. On the 2nd Oct. it for the first time appeared at the Deyra Dhoon; and although it remained only three days in the valley, it worked fearful desolation. Of the deaths in the village, we have no certain information; all that we learn being that they were very numerous; but in the Sirmoor Battalion, the seizures, out of a body of 900 men, were 113, and the deaths 74, almost two-thirds; and in the Lines, 73 women and children were cut off. This almost unprecedented mortality is accounted for from the circumstance of the medical officer being himself early seized with the disease; and the miserable sufferers being thence in a great measure left without medical aid. It will be observed, that the successive affection of Kumaoon and the

Dhoon, which are both situated beyond the lowest range of the Himmalaya, greatly weakens the force of some preceding deductions on the inaptitude of the disease to affect mountainous tracts.

During the last half-year, the Epidemic has certainly been on the decline in the Lower Provinces. The Jail Returns, which yield a pretty good criterion by which to judge of the health of their respective districts, have been generally favourable, and in many instances perfectly clean. The H. C's. shipping at the New Anchorage was again visited during the squally irregular weather of September. As on the former occasion some vessels wholly escaped, and others suffered severely. But the case of the *Carnatic* was peculiar. This ship anchored in Madras Roads on the 5th of August; clean, and with a healthy crew. Whilst at anchor, she had six cases of Cholera, all terminating favourably. She sailed on the 20th, with fine weather and light breezes. On the night of the 27th, a robust man, who had recovered from an attack at Madras, and returned to duty, was re-seized and died at 2 A. M. of the 28th. At 8 P. M. of the 29th, the joiner was seized, and died at 8 A. M. of the 30th. At 4 A. M. of the 30th, a healthy seaman, 35 years old, was seized and died at mid-day. In the same morning, of two healthy lads taken ill, one died at 3, and the other at 6 P. M. Another man was seized in the succeeding night, and died in seven hours. At 8 A. M. of the 31st, a healthy, stout, middle-aged seaman, dropped down in convulsions, and died at 6 P. M. After this, there were six other cases, but all terminated favorably. The sudden mortality in this instance appears to have been wholly produced by the unfavorable state of the atmosphere. The ship seems in her passage up the Bay to have kept close in with the shore; and during the 10th, was off Ganjam within 15 miles of the land, with a cold damp land-wind blowing all day.

The disease is now (December) prevalent in some spots of Nuddeca, and among the cooley establishment employed in clearing the Island of Saugor; but, as far as we are acquainted, in no other part of Bengal—that is, as an Epidemic.

It is a singular fact, that this giant malady has not only appeared with destructive violence in every part of our Asiatic dominions, but it has also prevailed, according to Boyle, Johnson, Curtis, and Hitchcock, at sea; leaving the theorist no room to ascribe the

cause of its rise and progress to loeal origin, malaria, or contagion. In 1814, I was myself eye-witness to the destruetive operation of this disease on board the ship *Mangles*, on whieh I embarked for India. We had been at sea about two months, when it burst forth with awful violenee. During the short period of six weeks, sixty-four bodies were thrown overboard, and four men died one after another just as we had east anehor in Table Bay.

To return to the General History of Cholera, we find that after it had seourged with its dreadful ravages the whole of our East Indian provinces, in the summer of 1821, it appeared on the borders of the Persian Gulf; and nearly at the same time at Museat, Bender-Abusher, and Bassorah. In Museat and its environs, during the short spaee of a few weeks, in the hot-weather, 160,000 of the subjeets of Prinee Oman perished of this disease; at Bassorah, and its neighbourhood, 18,000 died; and at Bender-Abusher, from 10,000 to 14,000. It likewise swept away several tribes of the Heekhabits. In June and July, in the spaee of a few days, 16,000 persons perished at Shiras. Towards the end of Sept. it made its appearanee at Jesd, proving fatal to 7,000 of its inhabitants. At the beginning of 1822, it appeared a seeond time at Jesd. It also visited the large towns of Nain, Kaschun, Koom, Koobrun, Sava, and Dain. It afterwards appeared at Killah, Nargund, Teheran, and Tauris. In the autumn of the same year, it prevailed at Karbin, Ardebil, and Shuvan, in the distriet of Kalkal, in the provinees of Ghilan and Mazanderan, and along the shores of the Caspian sea. Thus in the course of two years, this disease ravaged through the whole extent of eountry eomprehended between the borders of the Caspian sea and the Persian Gulf, eovering a surface of about 50,000 square miles. It prevailed at the same time in the ruins of Aleppo, in some parts of Syria, on the eoast of Egypt, as far as the island of Cyprus; simultaneously manifesting itself along the Tigris and Euphrates. It appeared also at Illah and Bagdad. In July, 1822, it raged at Mosul and Merdin; in August, at Diarbekir; in Sept. at Orsa; and in Nov. at Biri, Aintab, and Aleppo. It likewise prevailed in the environs of Laodieea, in 1823. In Aug. of the same year, it appeared with its usual fury at Antioeh; also in the village of Sarkin, at Sissershal, on the river Orontes, and

at Swedie, along the borders of the Mediterranean. It developed itself in the mountains of Lebal el Akia, (Mons Cassius,) and was seen between Selukia and Alexandria. Thus, the disease has spread over 90 degrees of longitude, and 66 of latitude, up to the year 1824. The Phillippine Islands (125° East Long.) form the eastern, and the borders of Syria, the north-western boundary of this disease; the Mauritius, the southern, and Astrachan, the northern limit. Since that time, it has threatened several parts of India, by occasional manifestations. In 1826, it appeared in China, with destructive violence; and in 1828, at Berhampore, in Bengal, in His Majesty's 14th Foot. In 1830, it continued at St. Petersburgh and at Moscow, where it raged with inconceivable fury. It has also prevailed at Warsaw and Riga in its most terrific form; and, by our latest accounts, it had appeared on the borders of Vienna. It has been calculated, from its regular progress hitherto, that it will not reach France and England until 1832. These countries ought, therefore, to be prepared to meet it at all events; since, according to Sydenham, it prevailed, especially in London in 1669, with a fury equal to that with which, by our descriptions, it has raged for the last fourteen years, over so large a portion of the globe.

SECTION II.

METEOROLOGICAL OBSERVATIONS,

BEFORE AND DURING THE

PREVALENCE OF THE EPIDEMIC.

I shall proceed to extract from the compilers of the Reports, all the intelligence on the State of the Weather, preceding and attending the prevalence of the Epidemic, which will be necessary to illustrate what we may hereafter deem preventive. Mr. Jameson's Report is particularly minute and valuable: he very properly opens his communication by observing, that it is only by the accumulation of large bodies of facts, that we can expect to arrive at any satisfactory conclusions in matters of science; and as the seasons, which we are about to describe, were certainly marked by very unusual irregularities, we should scarcely be justified in passing them over entirely unnoticed. It will still be left to the reader to determine what connection these had with the subsequent sickness, and what influence, if any, they exerted upon the rise and progress of the Epidemic. Before describing the nature of these irregularities, it will be necessary, for the sake of future comparison, to give the substance of Jameson's remarks on the weather usually prevalent throughout the year, on this side of India. In Bengal, and in the central and northern provinces of Hindostan, the seasons, obedient to the course of the sun, generally succeed each other with an undeviating regularity, quite unknown in the variable climates of the west. Taking their names from the qualities which peculiarly characterises their march, they have, by common acceptation, been divided into the cold, the hot, and the rainy seasons.

The cold season commences with Nov. and ends in February. About the middle of Oct. the weather begins perceptibly to change. The days are still oppressively hot, but the mornings and evenings gradually become cool. The wind, which during the preceding

month, had blown generally from the south and east, now begins to come round to the west and north, and to carry along with it the heavy masses of clouds, which almost constantly float about, and obscure the horizon, during the whole of the rains. The atmosphere, from being very damp and watery, grows dry and elastic: and the heavens begin to brighten a little. But these appearances are not yet uniform; the sky still at times becomes gloomy and overcast; and heavy showers, accompanied with thunder and lightning, shew that the south-east monsoon has not yet finally taken its departure.

In November the weather becomes delightfully fair and pleasant. A cold sharp wind now blows steadily from the north; the air is dry, clear, pure, and serene; the vault of heaven is of a beautiful deep azure colour, and in general not a cloud is to be seen; the nights are clear, with heavy dews. The Thermometer in the shade ranges throughout the month from 66 to 68°; the mean heat is about 74°, and the medium altitude of the Barometer 29° 98.

As December comes on, a considerable change takes place. Although the middle of the day and the afternoon are clear and fine, a haze generally collects towards evening round the horizon, and obscures the setting sun. As the night advances, thick fogs, sometimes general, sometimes partial, begin to collect, and do not disperse until morning. As they are broken up by the influence of the sun's rays, their vapours rise and form grey masses of clouds, which render the mornings hot and unpleasant, and do not disappear until the day is far advanced. These fogs do not by any means occur every night; sometimes, though rarely, the whole month passes over without them; ordinarily they appear only three or four times; sometimes during several nights successively. As in Nov. the north and west are the prevailing winds; they are very sharp, but blow steadily, never rising to a gale, nor falling to a perfect lull. The range of the Thermometer is from 56 to 78°, the mean temperature about 70°, and the altitude of the Barometer 30° 01′.

During January much the same weather prevails. The air is serene, though piercingly cold; the wind blows steadily, and, perhaps, more forcibly, from the north and north-west than in December. Fogs are still very frequent, and sometimes so thick, that scarcely any

object is visible until a late hour of the morning, and every thing exposed to the external air becomes wet, and covered with drops of moisture: they mav often be seen rolling in large dense bodies in opposite directions; during the clear nights, heavy dews fall. The range of the Thermometer is from 47 to 75°; the mean heat about 68°, and the altitude of the Barometer 29° 99′.

The weather keeps very pleasant until the second week of Feb. when the middle of the day grows warm, and the change of wind to the south and east, and the colleetion of elouds in the horizon, with threatenings of thunder gusts, portend the approach of the hot-season; at night the air is raw and cold, and the mornings are foggy. The Thermometer ranges from 65 to 82°, the mean heat is 76°, and the altitude of the Barometer 30° 3′.

Sometimes a few heavy and refreshing showers fall about Christmas: but the whole of the cold season is generally marked by the total absence of rain. It is remarkable how invigorating the eold bracing wind of the north, and the pure elastie air and clear sky of these months, prove to the European constitution, harassed, and broken down by the previous long continuance of moist and oppressive weather. The appetite and strength, whieh had long before failed, now return, and the whole frame becomes light and springy. Vegetable nature partakes of the generally salubrious effects of the season; and garden plants and exoties, at all other times killed by the excessive heats, now grow with freshness and vigour.

The hot-season may be eonsidered to set in fairly with Mareh. The sun now becomes very powerful, and the days are warm, and even hot. The air, however, is prevented from being oppressive by the strong and steady winds, uniformly blowing from the south. Fogs are yet not uncommon in the mornings, and as they elear up go to the north, to form with the thick aeeumulating masses of clouds that are constantly drifted along the horizon by the wind, materials for the approaehing storm. These storms, which by the inhabitants are termed north-westers, do not however generally occur till towards the middle and end of the month; they are usually preceded during several days by eloudy mornings and strong gales; then for one or two evenings comes on distant thunder, with strong gusts of wind, but without rain; towards the

afternoon of the day, in which the storm is to occur, the wind, which during the morning and forenoon had been continued and boisterous, begins to fail, and at length settles into a dead calm; the air becomes oppressively sultry; the clouds gather in the north-west, and form a deep dense, lowering bank; vivid lightning, accompanied with heavy thunder, and gradually advancing nearer and nearer, indicates the immediate approach of the storm. At length the calm is suddenly interrupted by a tremendous burst of wind, and by clouds of dust, which darken the horizon; then follow torrents of rain, with close and heavy thunder, which are soon succeeded by a serene sky and cool air. The appearances, however, which denote these sudden commotions, are not always the same: sometimes a shower of hail-stones precedes, or comes in the place of the heavy fall of rain; sometimes there is no rain, even when the fury of the wind, and quantity of the lightning are excessive. The general time of their coming on is about sunset; they rarely occur earlier than six in the afternoon, or later than midnight. When the days keep clear, and the wind moderate, heavy dews fall at night; but in blowing weather, there is no dew, the moisture being carried off by the wind, as it settles. The range of the Thermometer is from 73 to 86°; the mean temperature 79°; and the altitude of the Barometer 29° 86′; the fall in the mercury being ascribable to the prevailing high winds, and increasing rarefaction of the air.

April has generally blowing weather throughout. The prevailing wind is still the south; the atmosphere is sometimes clear, generally hazy, with much dust, and thick loose clouds continually moving to the north; the weather is hot, but pleasant, till towards the end of the month, when the nights become close and sultry. The general closeness, however, is from time to time relieved by thunder storms and seasonable falls of rain. The wind usually becomes hot to the feel about the 20th, and so continues to the end of the succeeding month. The range of the Thermometer is from 78 to 91°; the mean heat is 84°; and the Barometrical altitude 29° 75′.

May is the most disagreeable month in the year. In the commencement there is often high wind; but during the greater part of the month the weather is exceedingly close, still, and oppres-

sive; the nights, especially, are sultry; there is little or no wind in the mornings, which are thick and hazy, with low, gloomy, scattered masses of clouds; but as the sun rises, a breeze springs up from the south, and keeps gradually freshening until the evening, when it again fades away. The air is hot, but inelastic, and, as it does not carry off the perspiration, leaves the body moist and clammy. The dejection and lassitude now universally produced by the great heats, are, however, fortunately removed by the frequent recurrence of violent north-westers, with their usual accompaniments of thunder and rain. There are no fogs during April or May. The Thermometer ranges from 81 to 93°; the mean heat is 86°; and Barometrical altitude 29° 60′. In some years, but not generally, between the 15th and 25th of the month, the horizon becomes overshadowed with dark thick clouds from the south-east quarter; and much rain falls during several days, constituting what are called the lesser rains. But more commonly, the close muggy weather continues with little interruption, until the end of the first, or the beginning of the second week of June; when the veering round of the wind towards the east, the occurrence of thunder in the evening, and the constant cloudy state of the atmosphere, indicate the approach of the regular rains. These commence from the 4th to the 18th of June, and continue with frequent variations during the four following months. At first, they set in with thunder showers; sometimes heavy, sometimes light, generally from the south and east; then follow several days of very heavy rain; during which the sun is completely hid from the view; then there is a show of fair weather, with sunshine, and beautiful clear nights; but this is of very uncertain duration, and liable to be interrupted, with scarcely any previous warning. The heavy rain rarely keeps up for more than forty-eight hours at a time, gradually diminishing to drizzling, and at length, giving way to fair weather. There is at frequent intervals, during the whole period of the continuance of the rains much vivid lightning with violent thunder-storms, and strong gusts of wind. The wind frequently changes from east to south and west, rarely to the north: its return to the east, and fixing steadily in that quarter, is usually accompanied with heavy rain.

As soon as the rainy season has fairly commenced, the atmosphere becomes manifestly cooler, and the weather in general very pleasant; the only exceptions being now and then a sultry night, and the dead oppressive calm, which sometimes precedes a storm. From the dust and other particles which float about in the atmosphere, being carried away by the successive showers, the sky during the intervals becomes beautifully clear; the sun shines with great splendour, and the nights are bright, with innumerable stars. There is very little variation of the atmospherical temperature throughout the season. The Thermometer ranges from 77 to 88 or 90° ; the mean heat being about 81°. From the constant rain the air becomes surcharged with moisture, and every thing exposed to it gets damp and mouldy; there is consequently little alteration in the Barometer. The mean altitude is about 29° 45′ ; it is higher at night than in the morning, and lowest at midday.

In September, the Barometer is observed to rise a little, but there is little perceptible change in the weather till the middle of Oct.: the rain then begins to abate ; the showers are fewer in number, and, though heavy, of short duration; the wind becomes very variable. Thunder and lightning, however, are still frequent, but generally pass off without producing rain. The days are yet sultry, but the mornings and evenings begin to grow cool ; and the increasing clearness and elasticity of the air, with the coming of the dews at night, presage the speedy approach of the cold season. At length the veering round of the wind to the west north-west quarter, the disappearance of clouds and vapours from the horizon, the sharpness and dryness of the air, the rapid rise of the Barometer, and concomitant fall of the Thermometer, towards the end of the month, evince the entire departure of the rains. The total quantity of rain falling during the season varies much in different years. In Bengal, the average has been fixed at 70 inches.

The effect produced upon the face of nature, by the change from the destructive heats of April and May, to the refreshing days of June, is immediate and striking. The whole of the vegetable kingdom, which had drooped during the previous long drought, is brought into speedy and active life ; and the ground from being parched and bare, is soon covered with a luxuriant carpet of green.

The animal kingdom shares in the favourable revolution; and all space is filled with myriads of insects, just called into existence. The rivers, wells, and tanks are speedily filled to their margins. In the lower part of Bengal, the face of the country is soon covered with water; often to such a depth, that a passage may now be made in boats between places, which during the cold and hot season lay high and dry.

So much has been already written upon the diseases Endemical in this climate, that Mr. Jameson deemed it sufficient to enumerate their names, and to specify the seasons, in which their several species are most prevalent. The cold weather brings with it the ailments usually produced by marked alternations of heat and moisture; and Catarrhs, Intermittent Fevers, Rheumatisms, and Diarrhœas, are then common. The Bilious Remittent Fever comes on with the great heats of April and May, and predominates till August and Sept., when it gradually gives way to Bilious Dysentery and Bloody Flux. Acute Inflammation of the Liver is met with in all seasons, but is perhaps most common in the early part of the rains. Besides many disorders common to it with other climates, Bengal is in a particular manner noted for the production of Enlarged Spleen, and other distressing diseases.

It will be observed, that the foregoing notices are more applicable to Bengal and the Lower Provinces, than to the central and upper parts of India. In the latter, the seasons are considerably modified. The cold weather begins earlier, and lasts longer, and is far more sharp, dry, and invigorating: it is also very rarely accompanied with fogs. Throughout the hot months, the wind during the day, and earlier part of the night, blows strongly from the west; and is so dry and fiery, that it parches up the whole country. The rains set in late, and, though sometimes violent while they last, are of shorter duration.

The changes which took place in the course and succession of the seasons within the last few years, in every part of Bengal, and its dependencies, were so striking, as to have not merely attracted the notice of attentive observers, says Mr. Jameson, but to have become a frequent topic of conversation.

In the year 1815, a rainy season, which was marked by an excessive fall of rain, great inundations, and the bursting of the

Ganges, Soane, and Coossee rivers, from their banks, was succeeded by a damp unpleasant cold weather, with unusually frequent dense fogs in December and January.

The following hot weather, was remarkable for great heats and droughts, in consequence of the late and scanty appearance of the usual thunder storms. Although several north-westers occurred during April and May, they were very partial in extent, and for the most part unaccompanied with rain. On the 15th of April, 1816, a little before mid-day, a shock of earthquake was felt in Calcutta. Towards the end of May, the weather had become so oppressive, that the Thermometer sometimes rose as high as 98°,—an unusual height in Bengal; and many individuals, both Europeans and natives, dropped down dead in the streets.

Much the same kind of weather was experienced in the Upper Provinces. A severe cold season, followed by excessive drought, gave rise to great sickness amongst the natives: and by destroying the spring (Rubbee) crop of grain, led the way to the succeeding general scarcity.

In the Lower Provinces, the dreadful sultry weather continued until the 14th June, when the rains commenced. They kept up moderately in Calcutta and its vicinity, during the latter part of June, and the whole of July. A second shock of earthquake was on the night of the 11th July felt slightly at the Presidency, and more preceptibly at Moorshedabad. Towards the latter part of Aug. and the beginning of Sept. the rain became exceedingly scanty, and the days and nights oppressively hot in Calcutta; and in the western parts of the province of Bengal, the drought was so uncommon as to dry up the rivers, and occasion a failure of the rice crops. About the end of the first week of Sept. this unwonted drought gave way, and was succeeded by very heavy rain, which lasted all the month, and caused a greater and more general inundation than had occurred within the recollection of the oldest inhabitants.

The effect of these sudden and unusual extremes was very discernible in the unwholesome condition of the atmosphere, and in the kind of the prevailing complaints.

Instead of acute Dysentery, and the other inflammatory diseases generally predominant at this period, it was remarked by medical

men, that the only cases falling under their notice were Low Fevers, and other disorders of the Typhoid type. Of this, a remarkable proof was exhibited in the occurrence of malignant sore throat; a disease previously known only by name in this quarter of the globe.

In the Upper Provinces, the extraordinary scantiness of the rains was yet more remarkable, and was attended by more deplorable results. A few showers fell in the month of July, but they were partial and of short continuance. More generally from Benares upwards, Oude, the districts within the Dooab, and those west of the Jumna, were dried up by the long continued and unceasing heats. The parching westerly wind kept blowing throughout Aug. and the first fortnight of Sept. Not a shower fell; and so excessive was the heat, that tatties were in use at Futtyghur, Coel, and other stations, during the whole of this period. Since 1803, the memorable year of the commencement of Lord Lake's campaigns, no such season had been experienced in Calcutta. This long period of drought was succeeded by heavy and incessant rains, for many days, and the whole country was laid under water.

It was not to be expected, that so great a deviation from the common course of nature, and such extraordinary and sudden extremes, would prove wholesome to the human constitution. We accordingly find, says our compiler, that the sickness, before stated to have crept in amongst the natives, had now become general, and before the end of Aug. was raging epidemically in almost every town and city between Patna and Saharunpore. It exhibited itself in the shape of a Bilious Remittent Fever, of a violent Inflammatory Type, accompanied, like the Yellow Fever of the West Indies, with suffusion of the skin; and except when cut short in the commencement by bleeding and other powerful auxiliaries, rapidly running its course, and in spite of every remedy, terminating fatally at the end of two or three days. The width of its range precluded the possibility of its being referred to any causes purely local; and that it was not kept up by infection alone, was proved by the indiscriminate nature of its attacks. It seized equally Europeans and natives; and as readily entered the open and spacious house of the officer and civil servant as the crowded barrack of the soldier, or low filthy hovel of the native. The mortality produced by it in Delhi,

Saharunpore, Futtihgur, Benares, and other large cities, was very great. In Delhi, of two native corps alone, there were five hundred men at once sick in Hospital. In Dinapore, and at Ramnugger, the troops suffered severely. Of the European flank Battalion 648 strong, stationed at Allahabad, 305 men were attacked during Oct.; early in Nov. there were at one time 180 rank and file, and twenty women and children, on the sick list; and, in the whole, only 70 men out of the seven companies of which the crops consisted, escaped the disease. But Cawnpore was the principal seat of its ravages, amongst Europeans. Of four King's corps, the 24th Regiment of Light Dragoons, 735 strong, and the 14th, 66th, and 87th Regiments of Foot, 852, 813 and 702 strong, respectively, then in cantonments, there were from first to last nearly 1,000 persons taken ill. The disease here began in Aug. prevailed during the three succeeding months, and did not finally withdraw until the setting in of the cold weather in Dec. It was at its height in Sept. and Oct.; eight or ten, and sometimes fifteen men, dying daily during that time. The 87th and 66th Regiments suffered dreadfully. From the time of their reaching the station they lost nearly four hundred men. The former corps is stated to have had 519 in hospital at one time; to have buried 21 persons, (including women and children,) in one day, and upwards of 90 of its number within a month. This is a degree of mortality far exceeding any thing then on record in the medical annals of Bengal.

The effects produced by so unparalleled a state of sickness will be best understood, observes Mr. Jameson, from the following description written at the moment. "The stations chiefly affected wore a gloom hardly to be conceived. At the commencement of the cold season every family was suffering in some of its members. All social intercourse was interrupted; and the only communication between separate families, consisted in visits of condolence and consolation. Of numerous native villages, nearly the whole population was ill at one and the same moment; and many of the shops were shut for want of people to attend them. The banks of the river were covered at all times with the dead and dying; such had been the ravages of this dire distemper." It has been stated, that the disease abated in Dec.: so early as the end of November its attacks had become less frequent, and its symptoms milder,

but relapses were still common, and it was very difficult to counteract the extreme debility invariably consequent on the attack.

A similar mortality, preceded by great scarcity of grain, prevailed about the same time in Cutch, Sindh, and the other states bordering on the western side of India, which was by the natives ascribed to the plague. It is also said to have depopulated several cities, so that the living were unable to bury the dead. Throughout Upper Hindostan, it was observed that horned cattle were very sickly at this period; their bodies could be seen by passing travellers strewed in vast numbers in the pastures.

The foregoing is Mr. Jameson's account of the general sickness at this period, being an attempt to prove the existence of a distempered state of the air, dependent on irregularities of the season previously to the breaking out of the great Epidemic. I agree with him that it is only by the patient investigation of minute details, that we can hope to discover the causes producing the difference in the various constitution of the succeeding years.

The ensuing cold season, both in the Lower and Upper Provinces, was raw, damp, and unpleasant, and throughout cloudy, with frequent falls of rain. In Calcutta, the nights in November were marked by unusually frequent fogs, succeeded by warm days and light variable winds. During the month there were nine foggy mornings;. two days were cloudy, the remainder clear; the Thermometer generally ranging between 70 and 77° at 10 A. M. The same kind of weather prevailed in December. There were sixteen foggy nights, and on two occasions five nights in succession. The days were still warm and clear, with moderate breezes from the north and west. The range of the Thermometer was from 66 to 71°. The early and middle parts of January were cool and pleasant, with fewer fogs than in the former months. The prevailing wind was northerly, with more clear than cloudy days; and the Thermometer stood much as in December. On the 28th, light winds, chiefly from the south, with very thick fogs and sultry days, supervened, and so continued during the rest of the month.

The singular deviations from the ordinary course of the seasons, which marked the remaining part of the year, now began, and

February had much more the appearance of an autumnal than of a cold weather month : for it commenced raining heavily on the night of the 1st, and so continued every third or fourth day till the end of the month. The remainder of the month was cloudy, with high winds from the north and east. There were two foggy mornings. The Thermometer fluctuated from 67 to 73°.

March differed from the preceding month, only in the frequency of thunder storms, during nearly its whole course. Much and very heavy rain still continued to fall ; and there was a constant alternation of cloudy and clear weather, with winds varying greatly in strength, and latterly almost always from the south. On the 21st, there was an exceedingly violent thunder and hail storm followed by torrents of rain, which greatly injured the spring grain crop and the new sown Indigo lands ; and destroyed the blossom of the mangoe, and all other fruit trees then in bloom. The air, though cool, was raw and unpleasant. The Thermometer varied from 68 to 82°.

There was nothing remarkable in the diseases of this period ; both Europeans and natives were now in general uncommonly healthy. Among the former, Chronic Dysentery and Rheumatism were the prevailing complaints. On the 30th, however, a European soldier, belonging to His Majesty's 59th Regiment, then in garrison at Fort William, was attacked by Cholera Morbus, and in spite of every remedy, died in thirty-six hours.

April was generally cloudy, with strong southerly winds, and frequent thunder storms, and north-westers ; herein resembling the regular appearance of other seasons more than any preceding month. On the 18th, there was a heavy fall of rain ; and from that time to the end of the month, the air was dry and mostly clear. The weather was uncommonly cool till the 27th, the Thermometer not having once risen higher than 85° ; on the 27th the heat was 91°, and it kept up to nearly the same point during the three following days. A few cases of Fever occurred, especially among new-comers, about the middle of the month ; but generally there was yet very little disease in the settlement.

The first week of May was hot, sometimes with little wind. On the 3d there was a strong gale from the east, accompanied with rain ; on the 5th a north-wester came on, and on the 6th more rain.

During the two following weeks nothing extraordinary occurred; the southerly winds kept blowing moderately, with frequent showers. On the 17th, there was a strong gale from the south-east, with rain, followed by cloudy weather, which brought on a severe north-wester in the evening of the 24th. Up to this period, the air was cooler than usual to the feel, although the Thermometer generally stood at 82° at sunrise, and 90° at 3 P. M.

On the 25th of this month, the rains set in, and there was almost continual rain, with variable winds, close weather, and heavy clouds, till its close. As yet there was no interruption to the previous healthiness of the city : slight Fevers and bowel complaints filled up the sick list, and hardly an instance of Hepatitis came under notice.

From the 4th of June to the close of the month there was scarcely a fair day ; on many days the rain poured incessantly in torrents; and the season now began to be reckoned a very wet one. The rivers became high, and the tanks were already filled with water ; the mornings got cool, and the heat of the day moderate. The Thermometer ranged from 78 to 86° ; steady southerly winds, without storms or thunder and lightning. Fevers still continued to prevail moderately, with Dysentery, and now and then a case of Hepatitis.

In July there was hardly a dry day ; an immense quantity of rain fell, and before the end of the month, the river was quite full, and the country nearly under water. The sky was almost constantly cloudy ; the atmosphere generally cool and pleasant, at times close and sultry. The Thermometrical range was from 80 to 87°, medium heat 83° 33 ; winds variable, generally moderate. The prevailing diseases, although still of unusually limited extent, required more active treatment than before. To Fever, Hepatitis, and Flux, acute Rheumatism was now added, and proved rather troublesome.

From the 1st to the 10th of August, excessively heavy and almost incessant rain continued to fall ; on the 8th, 9th, 10th, and 11th, it poured in torrents, and without interruption. The weather was generally cloudy and calm, with south-easterly winds ; the temperature rarely higher than 85° ; often as low as 81°. The middle of the month was hot and oppressive, and the nights sultry

and disagreeable. The Thermometer then fluctuated between 81 and 87°; and there was little wind, generally south-west. From the 22nd, it rained every day; but, except on the 31st, not very heavily, till the close of the month; with variable winds, mostly from the south and east.

Amongst Europeans, the only complaints yet noticed, were slight Fevers, severe cases of Dysentery, and Hepatitis; but the natives now for the first time began to suffer severely from the Epidemic Cholera.

In the early part of September the weather continued close, sultry, and unsettled, with frequent showers; but previously to the 7th, the water in the tanks had fallen nearly a foot—a clear proof that the general body of rain given out by the clouds was now beginning to diminish. There was much rain, with variable winds throughout the remainder of the month. From the 16th, although the days kept hot, the mornings began to get pleasant, and the atmosphere at times to be free from clouds; so that in the middle and latter part, there were several clear days, with bright sun, and consequent great evaporation. The mortality had now become exceedingly great amongst the natives, and was no doubt increased by this amongst other causes. On the 28th, there was a fog. At this period there was no remarkable variation in the atmospherical heat. The Thermometer ranged from 82 to 89°; at sun-rise it generally stood at 84°.

The usual endemical diseases, Fever, Flux, and Hepatitis, were this month rather common; the Fevers were generally "slight, seldom needing the lancet;" the Dysenteries were, as is usual in hot climates, mostly connected with inflammation in the liver; and sometimes terminated in abscess of that viscus, and consequent death. Upon the whole it was observed, that in Calcutta, from the commencement of the preceding hot season, until the end of August, there was less sickness, especially amongst Europeans; and that the symptoms of the disorders, principally attacking them, were milder than during similar periods of many preceding years.

Several cases of Cholera occurred amongst Europeans at Calcutta on the 5th September, and from that day forward, the disease became daily more frequent. Why it reached them at this peculiar moment, cannot be discovered from the most careful scrutiny

of the meteorological observations for that period. From these it appears, that the first three days of the month were cloudy, with showers, and moderate breezes from the south-east: and that from the 4th to the 14th, the weather was constantly rainy; with fresh gales from the same quarter. And the fluctuations of the Barometer and Thermometer were during the whole time so small, as scarcely to deserve being noted down.

The weather continued unusually close, stagnating, and oppressive, during the whole of Oct. In the early part of the month, there was little wind, generally from the south, with an atmosphere sometimes cloudy, sometimes clear; frequent showers, and occasional heavy falls of rains; the Thermometer ranging from 82 to 88°. From the 9th to the 17th, there was a glimpse of fair weather, with light variable winds, and mostly clear sky. Then, late on the day of the 17th, the wind changed round to the north-east, and, blowing hard, brought from that quarter a deluge of rain; which, lasting without a moment's cessation for 27 hours, again filled the tanks, and laid the face of the country under water. The reduction caused in the atmospherical temperature by this change was sudden and great. The Thermometer at once fell from 87 to 71°; and during the 18th and 19th, did not again get higher than 74°. On the 19th the wind returned to its usual station in the south; and from that day forward to the end of the month, the atmosphere was unusually watery and cloudy, with little rain. The Thermometer meanwhile ranged between 78 and 86°; and the weather proved sultry and disagreeable. Excepting that Cholera had become more frequent, there was no remarkable difference between the disorders of this month and those of the preceding ones; perhaps acute Dysentery and Rheumatism were more frequent.

The weather should now, according to the common course of things, have become cool, settled, and fair; but the continuance of a cloudy sky, and unwonted humidity and warmth in the air, with the frequent occurrence of rain, throughout the month of Nov. proved, that the remainder of the year was to proceed with the same strange unseasonableness and insalubrity, which marked the early parts of its course. The wind getting round to the west, a good deal of rain fell on the 4th and 5th, attended by a consider-

able fall in the mercury. The days were then pleasant, with variable winds and sky, till the 23rd, when a storm came on from the north-west, and was followed by a heavy fall of rain. The Thermometer did not again go beyond 74° during the remainder of the month. The last week of the month was distinguished by very cloudy weather, with north-easterly winds, rain on the 29th, and a thick fog on the 30th.

Bilious Fever was common in the early part, and Intermittents in the end of this month. Fluxes prevailed throughout, and were sometimes severe. The diminution in the atmospherical temperature, which took place in the early part of the month, was probably the occasion of the returning comparative healthiness of the city, noticed at this period. On the 10th we find it stated, in a public letter from the Medical Board to Government, that the Epidemic was beginning to give way to the favorable change in the season; and the official returns shew, that the disease, from that time until the middle of the succeeding Feb. although still alive, was in a very languishing state.

Before proceeding further in this sketch, it will be useful to advert briefly to the state of the weather during the foregoing period, in the other districts of Bengal, and in Upper India, in order that we may see, whether in them the regular procession of the seasons was equally interrupted, as in Calcutta, and its immediate vicinity.

In the districts of Jessore, Backergunge, Nuddea, and every other portion of the Gangetic Delta, there had been a long protraction of very heavy rain; and nearly the whole country, especially in the lower division of the province, was one sheet of water before the middle of Aug. In Nuddea, the whole year had been rainy and damp; rain fell on eight different days in Feb. and four in March; in every week of April and May, there was a succession of thunder storms and rain; the river began to rise in May much earlier than usual; the rainy season was extraordinarily wet; lakes and tanks, which, in former seasons, remained dry a great part of the year, were filled, and kept so for a long time. It was calculated, that in the whole, 120 inches of water fell. In the eastern division of Bengal, the season wore a different appearance. In the Dacca district, the rains were con-

fined to June, and the first ten days of July; hardly a drop of rain fell in Aug. and Sept., usually very wet months. The inundation from the river was four feet short of its usual height. The same irregularity obtained in Sylhet, and the other tracts washed by the tributary streams of the Barampooter. From the end of Aug. not a single shower occurred till the 5th of Oct. when torrents poured.

In the middle provinces there was nothing very peculiar in the progress of the rains; but in the districts of Cawnpore and of Bundlekhund, and generally throughout Upper India, the rains were observed to be remarkably scanty.

We shall now return to the regular course of our observations on the season at Calcutta. Throughout Dec. it was clear, pleasant, and cool weather, but warmer than it ought to have been at the period of the year. Rain occurred on the 1st, and fog on the 28th, otherwise the weather was severe; wind generally northerly, and moderate; the Thermometer varying from 61 to 70°. To the complaints of the preceding month, were now added Agues and Diarrhœas, but they were not violent or numerous.

Of the succeeding year, January had an alternation of cool and pleasant, with close and hot weather, generally clear, with light northerly winds; it was foggy on the 11th, 20th, and 30th, and there was rain on the 17th and 31st. The Thermometer ranged from 62 to 78°. The dews at night were very heavy; during the four last days, the weather was warm, with southerly wind and cloudy sky. There was nothing remarkable in the complaints prevailing during the month.

The first part of February was cool and clear, with moderate winds, chiefly from the north and west, and frequent thick fogs; from the 19th the winds settled in the south. The Thermometer rapidly rose from 70 to 80°; and the hot season might then be said to have set in. On the 25th there was a north-wester, and on the 27th and 28th much rain. This sudden change about the 20th of the month, is worthy of particular notice, because it was at this very time, that the Epidemic, after dying away in November and December, and being nearly extinct during January, again took head, and, amongst the natives, raged with indiscriminate violence until the end of the following July. It now attacked Europeans

as frequently as natives ; but it did not, however, so readily yield to medicine as before.

March, like its predecessor in the former year, was marked by very uncertain and unseasonable weather. Up to the 12th the winds were variable, northerly, west, and south-westerly, generally moderate. The atmosphere partly clear, partly cloudy, and hazy, with much rain on the 4th, 5th, and night of the 6th; and the temperature mostly 70° at sunrise, and 76° at noon : on the 12th the wind set in steadily from the south, and at 3 o'clock of that day, the mercury rose to 87°; on the 15th there was a thick fog; on the 17th, fog; and from the 18th to the 29th, except the 24th and 25th, much rain, with strong gales, mostly from the south and west. On the evening of the 28th, it blew a hurricane from the same quarter. There was fog on the mornings of the 25th, 29th, and 31st, with northerly wind during the latter day. During this time the Thermometer fluctuated at sunrise between 74 and 80°; at 3 P. M. between 80 and 88°. There was much general sickness in this period of great irregularity. Bowel complaints were especially frequent. The Epidemic was now more common than ever amongst Europeans, and fresh cases were every hour pouring into the hospitals.

The early part of April was cloudy, with frequent strong gales from the south-east, and warm unpleasant weather. There was a north-wester on the 4th, the only one during the month; rain fell on the 4th and 13th, and about the 15th the wind settled steadily in the south; and blew hot from that time to the end of the month. The Thermometer fluctuated between 80 and 89°; the diseases this month were generally mild; few fatal cases of Fever occurred, though there were some of Dysentery. The Epidemic had now declined among Europeans.

There was a great deal of close hot weather in May, with southerly winds and cloudy sky throughout ; and several storms, without rain, from the north-west. A shower or two fell about the middle of the month; but these did little to lessen the temperature of the air, and the nights and mornings kept close and sultry, with a foul, hazy atmosphere; the Thermometer varying from 86° at sun-rise to 92° at 3 P. M. The prevailing complaints were much as in the former month; except that Dysentery was unusually frequent for the season of the year.

The rains set in early in June. As the weather now began to get more steady and regular in the vicinity of Calcutta ; and from this time the seasons, after so long a period of extraordinary deviation, seemed inclined to return to their ordinary course, and to abide by the laws marking their natural progress and succession, it will not be necessary to enter into a dry detail of the varieties of each succeeding month. It will be sufficient to state concisely their general appearance. The rains were seasonable and pleasant: an average quantity of rain fell during June and July; in Aug. and Sept. the quantity was perhaps in excess. But during the whole period, it was distributed with much equality ; so that there was neither deluge, nor long continued drought. Early in Oct. the weather cleared up, and gradually gave place to the cold season, which was mild in the beginning, moderate in the middle, and unusually cold towards the conclusion. Then came rather suddenly, a fortnight of unusually warm weather in February succeeded by a hot month of March, with frequent fogs, few northwesters, and hardly any rain. April was, on the contrary, unusually cloudy, with frequent storms, heavy rain, and strong gales from the south-east and north-east ; hot and pleasant days, and cold chilly nights; the Thermometer ranging from 76 to 86°. The 7th, 8th, 11th, 17th, 18th, 19th, 21st, 22nd, and 23rd, were rainy days; very heavy falls on the 7th and 23rd ; on the 22nd, constant rain. These details are entered into, observes the compiler, because this return of the weather to its old irregularity had an immediate effect in reviving the epidemic, both among Europeans and natives, and led to serious apprehensions of its being again about to run a new and fatal course, as it did after the short intermission during the cold weather of the preceding year. Many cases and some deaths occurred during the first twenty days of the month ; but the disease was more tractable than during its former visits, and again withdrew as the month of May brought round steady southerly winds and settled weather.

Of the preceding rains it may be remarked, that in every part of the Upper Provinces they were much heavier, and generally set in earlier than had been the case for many years before. In the Dooab, the districts in the vicinity of Delhi, Jeypore, and the other Rajpootana states, and in Nagpore and the tracts

bordering on the Nerbudda, they were unusually violent, and continued long, with little intermission. They at length gave way to an unusually severe and healthy cold season, in which the Thermometer, even as low down as the northern extremity of Bengal, fell during several nights to the freezing point, and for many days in Jan. did not rise higher than 37° at eight in the morning; a degree of cold quite unknown to that part of the country.

This sketch of the weather, so creditable to Mr. Jameson, being now brought to a conclusion, some apology may be necessary for its prolixity and minuteness of detail. It might, indeed, have been desirable to make it less dry and tedious; but as our compiler very justly observes, it was only by entering largely into particulars, and by minutely following the successive variations of each period, and thus affording the reader an opportunity of comparing them with the fluctuations in the healthiness of those periods, that we could hope to trace a connection between the influence of the prevailing pestilence, and the preceding irregularities in the season. How far this has been successfully done must be left to the reader's judgment, after he has perused the account of the history of the epidemic, which has been given. This, at least, he will not doubt, that there was a remarkable coincidence between the extraordinary irregularities manifested throughout India, in 1816 and 1817, and the epidemic; and that subsequent abatements and revivals of that distemper were in some measure dependant on corresponding vicissitudes in the state of the weather.

The average state of the Thermometer and Barometer at Calcutta, noted at noon, was as follows, during the years specified:

	1816.		1817.		1818.	
	Barom.	Therm.	Barom.	Therm.	Barom.	Therm.
Jan.,	....	....	29.96	67.83	29.90	68.24
Feb.,	....	.. ....	29.89	71. [illegible]	29.84	22.15
March,	......	....	29.81	75.14	29.79	78.10
April,	....	....	29.69	83. 7	29.73	83.29
May,	25.55	87.	29.65	84.77	29.66	87.66
June,	29.45	86.96	30. 2	83.63	....	84.
July,	29.36	82. 9	29.39	83.83	....	....
Aug.,	29.45	84.32	29.50	84.57	....	84.06
Sept.,	29.60	84.16	29.62	84.56	....	....
Oct.,	29.82	82.58	29.76	83.48	30. 1	79. 3
Nov.,	29.89	75.33	29.82	76.53	....	......
Dec.,	29.92	68.48	29.90	70.09	29.80	48.32

The state of the weather, at Madras, is given with equal accuracy to that which has been so distinctly noted at Calcutta, and on this side of India, by Mr. Jameson. "During the months of May, June, and July, (says Mr. Scot,) while Cholera prevailed to so great an extent in the four regiments, and on ship-board, if not altogether unknown amongst the other European and the native troops at the presidency, St. Thomas' Mount, and Poonamallee, and amongst the European and native population of these places, it was at least of as rare occurrence as at any former period, since its first invasion. As the season of 1822 was generally considered to have been one of unusual heat at Madras, and to have been distinguished by an uncommon prevalence of hazy weather and south-west winds, this may be the most proper place for some observations on the subject.

" In May 1822, there were 16 days with clear sky, nine alternately clear and cloudy, and six days cloudy and hazy. The mean height of the Barometer, in May was 29° 90′, and that of the Thermometer was 92° 25′. The extreme height of the Thermometer was 101°, and its least height 83° 5 ; rain fell in showers on the 25th and 26th, and again on the 30th ; the wind was westerly, and varying from N. W. to S. W. fourteen days. The first twelve days of the month were clear with S. E. wind; the 13th day was clear and hazy with calms, and S. E. wind; the 14th was hazy, the wind W. S. W.; hazy weather prevailed from that time till the 20th, when the sky became clear, and continued generally clear, till the 30th. The greatest heats occurred after the 19th ; on that day the Thermometer stood at 99°, and on the 24th at 101°. The moon was distant from the earth on the 6th, and nearest to it on the 20th; full moon took place on the 6th, and new moon on the 21st.

" The mean number of clear days in the month of May, from 1815 to 1819, was 21, and clear and hazy days 4, making 25 during the month, as in 1822. In 1820, May presented 14 clear, and 8 clear and hazy days, making 22 ; and in 1821, 15 clear, and 9 clear and hazy days, making 24. In this respect accordingly, there was nothing unusual in May, 1822.

" The mean height of the Barometer in May, from 1815 to 1819, was 29° 88′, in 1820, 29° 38′, in which month, a great storm took place ; in 1821, it was 29°90′. The mean height of the Thermometer in May, from 1815 to 1819, was 90°, 55′, in 1820 it was 86°;

and in 1821, 89° 5′. The mean greatest heat from 1815 to 1819 was 101° 4′: in 1820, the greatest heat was 98° 2′; and in 1821 it was 96° 5′. In respect to the Barometrical phenomena, therefore, the month of May, 1822, was not distinguished by any material deviation from former years; but in respect to the Thermometrical phenomena, the mean height was 1°7′ above that of the five years from 1815 to 1819; 6° 24′ above that of 1820; and 3° 20′ above that of 1821. The extreme height in May 1822, viz. 101° was however nothing very uncommon; in 1815 it was 104° 50′; in 1816, 100° 7′; in 1817, 98° 50′; in 1818, 103° 80′; in 1819, 97° 70′; in 1820, 98° 2′; and in 1821, 96° 5′.

"During the last eight years, the quantity of rain which has fallen at Madras in May, has been too inconsiderable to be measured by the rain-gauge, excepting in 1816, when 2-10ths of an inch fell, and in 1820 on occasion of the storm.

"With respect to the winds which prevail in May, they blow chiefly from the S. E. when blowing from the lands. It does not appear distinctly from the Meteorological Tables, until 1820, whether the quarter was due west, or to the southward of west; but as these winds form what is called the south-west Monsoon, it is fair to conclude, that their direction is not different now from what it was in former years. In May 1815, there were 21 days with westerly, or land-wind; in 1816, there were 15 days; in 1817 however, there does not appear to have been one day of westerly wind; in 1818, there were also none; in 1819 there were only 3 days of westerly wind; in 1820 there were 15 days of westerly and south-west winds; in 1821 only 4 days; and in 1822, 14 days, which are noted in the Tables as S. W. A remarkable deviation would seem therefore to have taken place in respect to the winds, in the month of May at Madras, in the years 1817 and 1818, which were the first years of the epidemic in India, although it did not reach Madras till Oct. of the latter year. In 1819 a partial re-establishment of the usual westerly wind took place; in 1820, there was a nearer approach towards it; but in 1821, a repetition of the former irregularity; in 1822, however, the usual or nearly the usual number of days with westerly winds was observed. The month of May has been thus particularly noticed, as during its course the most formidable attacks of Cholera yet experienced on this establishment, took place in three European Regiments, and in two

of the Company's ships; while the other troops, and the surrounding inhabitants entirely escaped. As June and July were likewise distinguished by the prevalence of Cholera amongst the newly arrived troops, a short retrospect shall be given of the Meteorological phenomena of these months also.

"At Madras, the weather in June is usually cloudy, with occasional showers; and it is cooler than in May. In 1822, June presented only 4 days of clear sky, 4 of clear and hazy, and 22 of cloudy and hazy. The mean height of the Barometer was 29° 86′, and that of the Thermometer 87° 9′; the wind blew from the westward 22 days; 1.525 inch of rain fell. The mean number of clear days in June, from 1815 to 1819, was 5 of clear and hazy, and of cloudy and hazy 23; in June 1820, there were 4 clear, 5 clear and hazy, and 21 cloudy and hazy days; but in 1821, in June there were 19 clear, 3 clear and hazy, and only 8 cloudy and hazy days. The mean height of the Barometer in June, for 5 years, from 1815 to 1819, was 29° 86′; in 1820 it was 29° 70′; and in 1821, 29° 93′. The mean height of the Thermometer in June, for the same periods was 89° 19, 83° 3, and 91° 6′. In respect therefore of the Barometrical and Thermometrical phenomena, the month of June 1822, was remarkably regular. The mean quantity of rain which was measured by the gauge in the months of June, from 1815 to 1819, was 0.24; in 1820, it was 0.85′; in 1821, 1.1; and in 1822, 1.525. The quantity of rain, therefore, seems to have been greater this year than usual, as it also was in the two preceding years. The mean number of days of westerly wind in June for five years was 14; but in June of the year 1817, there were only 7 days of west wind, which makes the mean too low; in June 1820 and 1821, there were 26, and 22 days of westerly wind, which agrees nearly with the same month in 1822.

"The weather in July at Madras is pretty similar to that of June; and in the year 1822, it presented nothing unusual. The number of clear days was 10; of clear and hazy 1; of cloudy and hazy 20; the mean height of the Barometer was 29° 90′; and that of the Thermometer 85° 75′. The wind blew from the westward 19 days; 0.55 rain fell; the mean number of clear days in July from 1815 to 1819 was 4; of clear and hazy 3; and of cloudy and hazy 23. In July 1820, there were two clear days, 5 clear and hazy, and 24 cloudy and hazy; in 1821, July presented 1 clear day, 10

clear and hazy, and 20 cloudy and hazy; the mean height of the Barometer in July, from 1815 to 1819, was 29° 85′; in 1820 it was 29° 95′; and in 1821, 29° 92: the mean height of the Thermometer for the same periods was 86° 36′, 87° 4, 88°, 85° 75′. The mean number of days in which the wind blew from the westward in July, from 1815 to 1819 was 15; in 1820 it was 22; in 1821 it was 18. In these respects, therefore, the month of July 1822, was remarkably regular. In regard to the fall of rain in July, however, considerable irregularity seems to have prevailed; the mean of five years from 1815 to 1819, in the month of July was 5.73; but the fall in July 1818, was 12.75, exceeding all former examples almost; the average of 4 years, excluding 1818, gives 3.22; in 1820 the fall of rain in July was 3.525; in 1821, it was 1.20; and in 1822, only 0.55 as above stated.

"The mean heights of the Barometer and Thermometer during the three hot months, May, June, and July, from 1815 to 1822, were as follows:

1815	Barometer	29.82	Thermometer	87°
1816	,,	29.84	,,	88°
1817	,,	29.91	,,	88°
1818	,,	29.87	,,	88°
1819	,,	29.86	,,	89°
1820	,,	29.74	,,	87°
1821	,,	29.92	,,	89°
1822	,,	29.89	,,	88°

"Were they to judge," says Mr. Scot in conclusion, "by their bodily feelings, most persons who resided at Madras during May, 1822, would be disposed to affirm, that the heat in that month was intense, the atmosphere oppressive, and lowering in an unusual degree; the sky gloomy, and the winds most distressing and enervating, combining much of the relaxing property of what are termed 'long-shore winds.' It is certain, that the salubrity of an atmosphere cannot be determined by philosophical instruments, any more than by our feelings; and that even our perceptions of its sensible properties are considerably influenced by the imagination; but this seems the proper place to admit, that the weather at Madras, during the period in question, was not, to our sensations, that which it was indicated by instruments, to be, viz. a season in most respects regular. The Epidemic has arisen, and has prevailed during every state of the weather; its appearance at stations and in corps, during cool and during hot weather, are very nearly equal in point of number."

SECTION III.

ON THE

NON-CONTAGIOUS NATURE

OF

CHOLERA.

A belief existed among a few medical gentlemen on the Madras side, that the disease was contagious. "It has spread," says Mr. Scot, "from the central parts of Bengal to all the adjacent countries; and though it may have appeared nearly simultaneously in many parts of Bengal, situated at considerable distances from each other, yet its progress beyond that tract has been uniform and progressive. We have seen this fully exemplified in the progress which it has made during the space of five or six years; it having, in that time, reached very distant countries, and left no interjacent countries untouched. In respect to the peninsula of India, the narrative will clearly evince, that the progress of the disease, from north to south, has been effected with surprising regularity, both geographically, and chronologically; for any deviations which may appear to have taken place in the irregularity of its march, in regard either to place or time, may, with some probability, be referred to intervention of cross roads, or to the interruption of regular main roads, and to the effects of the prevalent winds. For example, its progress during the prevalence of the S. W. winds was slower from Ganjam to Nellore than it was from the latter district to the remaining southern portion of the coast, after the wind had set in from the N. E. Even admitting that insulated cases of Cholera have appeared in some places, before any had happened immediately to the northward of these places, it would be but reasonable to view them as sporadic, since they have been shown to have occurred at all times, and to be in fact endemial in the climate of India. The wide and uniform diffusion of Cholera,

which we have witnessed, has taken place over countries bearing little or no resemblance to that where it originated; and of which the seasons especially have been altogether dissimilar." Mr. Scot therefore concludes, that it may consequently be inferred, either that the disease has been propagated by infection or contagion, or that its progress is owing to circumstances beyond our knowledge, thus ranking Cholera amongst many other epidemics, the causes of whose origin and progress are equally unintelligible and unknown. The latter conclusion obviously leaves the question of the infectious or contagious quality of Cholera undecided. The supporters of that theory object to the occult or unknown circumstances alluded to, being resident in the atmosphere, forming what might be termed its choleric constitution; for they observe, that the disease in that case, could not make any sensible progress directly against the continued and violent monsoon winds, nor could villages or tracts of land escape the disease, where all around them were suffering from it. They confirm these arguments by the following facts.

" Bodies of troops in motion have been attacked, and have retained the disease, while it was unknown to the fixed inhabitants of the country through which they passed. One of two corps in a camp has been attacked, and the other has escaped the disease. Ships arriving from other parts of the world have never suffered under the assumed epidemic constitution of the atmosphere before reaching the shore. They further urge, that the supposition of a power, not infectious, existing in the air, which is capable of producing the disease, is purely gratuitous; and has been shewn to be hardly reconcilable with our acknowledged experience. Diseases avowedly infectious, such as the small-pox, measles, &c. have not, at all times, the power of spreading epidemically; for while it is certain, that their exciting causes are never wholly extinct, it is only at particular periods, that these diseases become epidemic, though we are not acquainted with the circumstances from which this power of epidemic propagation arises. The same may be the case with Cholera, though the causes of its epidemic diffusion would seem to occur only at very lengthened intervals. All the atmospheric phenomena, and other circumstances brought under the head of occasional causes, have with little or no interruption, existed from

the beginning of time without producing Cholera, except at those particular periods. Consequently, the superaddition of a new cause must be inferred."

Such are the arguments, which the supporters of the doctrine of infection or contagion have derived from the general appearances attendant on the rise and progress of Cholera. Mr. Ogilvie also quotes the following facts. Speaking of the insidious nature of the disease, he observes:—"In the first place, it has prevailed in a degree, equally violent at all seasons of the year; in regard to temperature, from 40 to 50° of Farenheit to 90 or 100°; in regard to moisture, during the continuance of almost incessant rain for months, to that dry state of the atmosphere which scarcely leaves a vestige of vegetation on the surface of the earth. Secondly, although what has been adduced, may not appear to some to be sufficient evidence of the fact, it appears to us incontrovertible, that it is capable of being transported from one place to another, as in cases of ordinary contagion or infection, and also to possess the power of propagating itself by the same means that acknowledged contagions do; that is, by the acquisition of fresh materials with which to assimilate: at the same time, perhaps, subject to particular laws with which we may never become acquainted. Aware, however of the doubtful nature of the ground which we tread, amidst the contrary opinions that have been advanced on this subject, we shall content ourselves with stating a few facts, which have been supplied by gentlemen, whose Reports have been already printed, and which might be increased far beyond the limits to which we think it necessary to confine ourselves. In October last, when the disease had almost disappeared at Tannah, the attention of Mr. Jukes was called to a case that had occurred in one of the apartments of the barracks of that fort, appropriated to European troops; this owing to too late application for medical aid, soon terminated fatally. Another case appeared a few hours afterwards, the subject of which was saved with much difficulty and danger; and in the course of six succeeding days, no less than nine cases occurred in the same apartment. The curiosity of Mr. Jukes was naturally excited to ascertain under what circumstances so much disease was produced; and on examination, the ward appeared to be both badly ventilated and too much

crowded with men; the place was immediately emptied, scoured, and fumigated, after which, no other case occurred. Since the middle of December when we had flattered ourselves that the disease was vanishing, as the cold season advanced, the number of cases considerably increased in this island, Salsette, and the Concan, and consequently excited much alarm. In some instances these cases have been confined to particular spots, and sometimes to particular houses, where the disease has attacked and destroyed in succession whole families, consisting of three, four, and five persons; while in others, only a single case, or at most very few have occurred. We are utterly ignorant of any local circumstances to which such a change can be ascribed, unless by supposing that a diminution of temperature, together with exposure, may have called into action some latent remains of an active poison; otherwise it seems difficult to reconcile these facts with what is observed in ordinary Epidemics.

"It will be observed, that Mr. Jukes, in his Report, remarks that the disease, as it first appeared at Tannah, did not go through families when one had become affected; he has since seen sufficient reasons to alter his opinion in regard to that particular; and we think that we have observed in several instances, that the disease has shewn a greater tendency to spread, where the first attacks have proceeded in their course to a fatal termination, which they invariably do, when not counteracted by medicine. How far the same thing has been observed to happen in other Epidemics, we cannot determine."

It cannot be denied, that there were some circumstances in the manner in which the disease arose both among the Hansi and centre divisions, as mentioned by Mr. Jameson, that induced a persuasion among all the Medical Staff present with the Hansi force, that it was communicated by the Meerut detachment, who got it in passing through Delhi, at the time of their crossing the Jumna. The opinion of so many intelligent persons is entitled to respect; and would entirely set at rest the question of contagion, understanding by that word, the communication of the disease from one large body to another large body, were it not counterbalanced by some circumstances of an opposite tendency. If we believe, as stated by one gentleman, that before the junction of this detachment,

the disease had already found its way to several places intermediate between Delhi and Hansi, and Delhi and Kurnaul, we can be at no loss to account for its rise in camp, without resorting to a belief in the contagion. For the camp, says Mr. Jameson, presented to the Epidemic exactly that face of things, which we know to have been always particularly affected by it, namely, a large body of men collected within a narrow space. We are accordingly told, that previously to the junction of the Meerut detachment, one or two cases had actually occurred amongst the camp-followers. Admitting this to have been the case, the certain consequence of the great additional stock of pestilential matter imported from Delhi, would be to aggravate, and widely diffuse the disorder; and the whole mischief might very naturally be placed to the account of the new comers, by persons unaware of its having begun to operate, though in a less degree, previous to their arrival. However this might have been, there were no grounds for supposing, that even here the disease was communicable from person to person; and the medical officers are unanimously of opinion that it was certainly not so.

The case of the centre division is encompassed with still greater difficulties. The main body of this division crossed the Jumna at Shergurh, on the 28th Oct. and after one or two days' halt, marched in a north-westerly direction towards Loharee, Nuddee-ka-gaon, and Teraii.

A detachment, composed of 5 companies of the 2nd Battalion 13th Regiment, N. I. and two companies of Pioneers, was left behind in charge of the bridge of boats thrown over the Jumna. It was there that the Epidemic first shewed itself. A few cases appeared as early as the 2nd of November, in some troops then passing over; but on the 5th, the disease became common in the detachment on guard. On the 9th, this detachment joined the main body of the army at Teraii; and it is declared by some of the medical officers then on the spot, that during the two immediately subsequent days, the disorder was first observed in camp. In support of the opinion, that this detachment brought the disease into the previously healthy division, it is added, that the 2nd Battalion of the 13th Regiment was brigaded to the left of the 1st Battalion 24th Regiment Native Infantry, and the 1st Battalion of the 24th

Regiment, to the left of the 2nd Battalion 11th Native Infantry; and that the 24th was attacked before the 11th. Lastly, in further proof of the communicativeness of the virus, it is affirmed, that the previously healthy villages, and among other places, the town of Sumpter, caught the infection from the division. This is the amount of facts in favor of the disease being capable of transmission by a large body, from an infected to a distant salubrious atmosphere, and thus communicable by contaminated to healthy individuals.

It must be confessed, continues Mr. J. that this evidence is very strong, and would prove quite conclusive, could it remain unshaken. But, unfortunately for the hypothesis meant to be established by it, there is hardly one item of it that is not opposed by circumstances of a contrary tendency. And, first, with regard to the appearance of the disease in the main body of the division, the testimony of different individuals is so much at variance, as to be quite irreconcilable. Of twelve medical officers, who have given replies to the queries on this point, one states the disorder to have broken out on the 6th; two on the 7th; one on the 8th; two on the 9th; one on the 10th; four on the 11th; and one on the 12th. The discrepancy, however great, is easily explicable, when the insidious nature of the disease at its first onset is taken into account, and when it is recollected, that the sphere of each individual's observation, would hardly extend beyond the Battalion immediately under his charge. But how are we to reconcile the assertion of its having appeared on the 6th, 7th, 8th, or even the 9th, with the assumed hypothesis of infection from the Shergurh detachment? This much, however, may be affirmed, from a review of the whole progress of the Epidemic in this quarter, that the infectious medium, in whatever it consisted, was confined within a very circumscribed circle; and was very slowly extended to healthy parts of the atmosphere. If, setting aside the circumstances militating against it, we take it for granted, that the infection was truly received by the centre and Hansi divisions from the detachments above-mentioned, although not communicable by contact from person to person, all that can be concluded is, that it might be communicated from one large body to another large body; and that wherever the disease got head amongst a number of men, it assumed some new quality, so as, when mixed with the atmos-

phere, to become infectious. What constituted this additional quality, we cannot pretend to determine: but in support of its existence, we may quote the predilection of the Epidemic for cities and camps; the infection of the left division and the Nagpore and Meerut troops, immediately after entering into the diseased medium at Jubbulpore, Nagpore, and Delhi; and the similar case of the troops and followers in attendance upon the Governor General, being attacked shortly after communicating with an infected village in the Gorruckpore district. To the same account may be placed, the progressive march of the disorder from one part of an infected place to another; as in the centre and other divisions, and more particularly, the Rajpootana Force, in which the virus seemed to be regularly propagated from corps to corps.

The line of this force faced nearly north and by east. The troops were arranged in the following order, commencing from the left. The 1st Battalion 28th N. I. 6th and 7th companies of Pioneers; Goolundaz and Gun Lascars, the park in the centre; 5 companies 1st Battalion European Artillery; 1st Battalion 27th N. I.; squadron of 2nd Regiment Cavalry; 2nd Local Cavalry; in the rear of the park were 415 ordnance drivers, with lines of officers' tents intervening. The 1st Battalion 28th and Goolundaz, were attacked on the 14th Sept.; on the 15th a few cases occurred amongst the Pioneers and Lascars, but among them and the gunner drivers, they were not numerous till the 19th. On the 28th the squadron of Cavalry was attacked; and on the 20th the local Cavalry, and 1st Battalion 27th N. I. It must, however, be remembered, that the ground was drier on the right, than on the left of the line. In some instances, the suffering body would appear to have sickened immediately upon coming into the poisonous medium; as was the case with the Nagpore troops, who were affected on the very day in which they encamped at the infected village of Gaongong. But more frequently, one or two days would seem to have been requisite to bring the virus into action. Thus the Meerut detachment entered Delhi on the 29th and was not affected till the 31st; thus too, the Hansi troops had not the disease till the 6th, the day after the junction of that detachment. Again, by those abetting the opinion of the disorder being communicated to the centre division by the

Shergurh detachment, it is stated, that the first cases occurred on the 11th, two days after its junction. Lastly, the followers of the troops in personal attendance upon the Governor-General, in April, first suffered on the 23rd, three days after encamping near an infected village.

The disease recently appeared in a detachment of the Rajpootana force, under such circumstances, as at first seemed to warrant a suspicion of the existence of contagion. A detachment, consisting of a troop of the 3rd Regiment of Cavalry, two companies of the 1st Battalion 1st Regiment, and one company of the 1st Battalion 6th Regiment N. I. left Colonel Ludlow's camp in March for Indore, to meet the escort of Chimnajee Appa; in this escort were four Rissalas of Skinner's Horse, which had come from General Smith's camp, south of the Nerbudda, and from the time of their leaving it, had been affected with Cholera; on the 22nd of March the disease appeared in the detachment then at Oujein; and between that day and the 27th, when, from the judicious means of separation and constant moving resorted to, it disappeared, forty cases, 31 in the 1st and 9 in the 6th Regiment, occurred, of which 8 of the former, and 3 of the latter proved fatal: there were likewise seven deaths among the camp-followers; but no case occurred in the troop of Cavalry. Whilst this detachment was performing quarantine at a distance of twelve miles, a similar force sent to take its duty was not affected in March, although Skinner's Horse and the Mahrattas marching only a few miles in their rear, were daily losing men. It would appear, but at what precise time is not mentioned, that the disorder during the following month attacked the main body of Colonel Ludlow's force stationed at Onail, about twenty miles distant from Oujein. The second detachment with Chimnajee had apparently become affected previously to this, and like the former had been secluded. During April, fresh cases were admitted into hospital from the 1st Battalion 1st Regiment, of which one only was fatal; of 20 bearers and workmen 4 died; of the 6th Regt. 19 sepoys were seized, and 7 died. In the 3rd Cavalry the disorder was slight, and only two grooms died. When the disease got into the lines at Onail, the first person seized was a blacksmith, who died in a few hours. The brother of this man was attacked whilst bathing, after burying the corpse;

and next morning a third inmate of the same tent: but not an individual in the tent of the 1st Grenadier company 1st Regiment, which was only six yards distant, was seized from first to last. A case nearly similar occurred in the 6th Regt. A sepoy died of the disease, a Naick who had been setting up with him, was attacked as they were closing his grave, and likewise died. But not a single patient in hospital, nor any of the attendants who slept close to the sick, breathed the same air, and were constantly lifting them up and laying them down, and rubbing their bodies with oil, were attacked. Unfortunately we have no particulars regarding the seizure of the blacksmith's brother and companion; but is it not more likely that his illness was ascribable, as in innumerahle other well ascertained instances, to the depressing influence of fatigue, grief, and the other usual predisposing causes, than to infection? How was it with the Naick? His case is at first sight equally suspicious; but fortunately we know more of its concomitant circumstances; he had attended the sepoy, his friend, during his illness, and wailed over him when dead; and after a night of sorrow, when exhaused by fatigue, mental anxiety, and fasting, he followed his corpse to the grave, to a considerable distance, in the heat of the forenoon. But this is not all, for it appears that when heated by several hours' exposure to the mid-day sun, he incautiously drank a large quantity of cold water, and was immediately taken ill. So that in his case, we have all that constitutes the essence of the predisposing and exciting causes of the disease. It may be said that the benefits derived by this division from segregation, proved the contagious nature of the Epidemic; but in other quarters change of ground and scene had invariably the same good effccts without the aid of scparation. The appearance of sickness was here preceded by exactly the same atmospherical phenomena, as in almost every other part of India; easterly winds, very hot days, and great variations of temperature between the day and night. The probability is that the whole atmosphere in that quarter soon became corrupt; for a detachment of the 2nd Battalion 5th Regiment N. I. and of the 1st corps Local Cavalry, at the same time got the disease, and lost thirteen men, whcn encamped on the banks of the Miah river, when no mode of conveyance of the virus could be traccd. But there too the days were very

sultry and the nights chilly, and the men had been indulging in eating unripe mangoes. No case of recurrence of the disease appeared in any of these detachments. These facts are an unquestionable proof against contagion. Mr. Scot observes, that by far the greater number of medical men concur in the unqualified opinion, that Cholera is not an infectious or contagious disorder; and they conceive, that the phenomena of its origin and progress can be more satisfactorily explained by the laws of Epidemic diseases in general. They observe, that there has been a marked intemperature of the seasons, preceding and accompanying its appearance; and they assume, that a certain, though perhaps occult, morbific state of the atmosphere has hence taken place, under the influence of which, the predisposing, occasional, and exciting causes universally admitted, are sufficient for its production. Such a condition of the atmosphere may not be general through a whole country at once; it may arise, especially, from the soil of certain tracts only; and it may possess the power of producing a similar condition in the air, with which it comes to be commixed. The progress of almost all Epidemics has been more or less progressive and gradual, although the concurrent opinions of most medical men have been directly adverse to the idea of their being of an infectious nature.

They contend, that if Cholera had been infectious or contagious, it would be utterly impossible to account for its partial invasions, as evinced in the many instances already cited. Thus, two corps marching together and keeping up an unreserved intercourse, the disease may prevail in one, and be unknown in the other; troops passing through countries suffering from it entirely escape, or they experience severe attacks, while inhabitants of the countries through which they pass are exempted; detachments of a Regiment arriving from a particular place may suffer severely, while the rest of the Regt. which has remained stationary hardly furnish a single case, although the former may be living in the same barracks, and their sick in the same hospital. Above all, they contend that the evidence of the non-infectious, or non-contagious quality of Cholera is clearly established, by the escape, in so many instances, of the attendants on the sick; not only in the case of medical attendants, who may be admitted to be inured to the contact of sick; but of the attendants of every description, who have slept on the same

beds with the patients, and maintained such an intimate intercourse with them in every way, as to render their general immunity from the disease altogether irreconcilable with the idea of infection or contagion. They observe, that if medical men have, in some, or even in many instances suffered, and if the relations and attendants, and whole families have fallen victims to the disease, it is fairly attributable to the effects of their great fatigue, their anxiety, their mental depression, and their exposure in common to the occasional causes, such as bad food, privations of various kinds, indifferent shelter, and peculiar local circumstances.

The most striking instances of immunity from the disease, under the most intimate personal intercourse, will be found recorded in the original Reports. In the hospital of the Royal Regiment, only one individual, out of a hundred and one attendants, was attacked with the disease. In that of the 11th Native Regiment at Vizianagram, as recited by Mr. M. Andrew, not one was seized, although their numbers would seem to have been great. In the hospitals at Trichinopoly, no attendants were taken ill, and many medical officers appear to have slept in their hospitals, without suffering any bad consequences. At St. Thomas' Mount, where a general receiving hospital for patients with Cholera was established, and where the numerous attendants were people not at all accustomed to hospitals, not one of them was taken ill; yet it was not uncommon to see them using the bed-clothes of patients who had just recovered, or died. The same observation applies to the numerous receiving hospitals established at Madras. Mr. Acting-Surgeon Gibson, in reporting on a late attack, (April 1823,) experienced by the Regiment, at Wallajahbad, observes: "I had ninety-two admissions, and increased the establishment of servants to double. I lived in the hospital, amidst the sick, day and night, and yet, neither myself, nor any of the servants got the disease; but the hospital serjeant's wife, living in a retired room, not near any of the diseased, had a severe attack. The disease came on suddenly, with a hot land-wind, and went off as suddenly, when it ceased. At my suggestion, that wing of the Regiment in which the disease prevailed the most, was encamped on a piece of high ground, in the neighbourhood, and not a case came in from camp, although every intercourse imaginable was kept between it

and the barracks." No steps were taken to prevent contagion, when this wing of the Regiment returned to the same barracks; and yet no Cholera has since been heard of.

"If by contagion," observes Mr. Jameson, "is meant the communication of the disorder from person to person, by means of contact, or close conversation, then, in this strict sense of the word, Cholera is certainly not contagious. In the absence of all positive proof, such a conclusion might have been fairly drawn, from its being observed, that in no quarter of India, during the time in which it was severely scourged by the disorder, did its infectious nature form any part of the popular belief. Amongst a rude and superstitious people, unexampled mortality caused by it, was, according to the fancy of the individual, ascribed to fatality, to the agency of malignant spirits, or to the anger of an offended deity; but it does not appear to have been once suspected, that its amount was increased or diminished, by the forced or restrained intercourse of men. It may be said, in diminution of the weight here attached to the popular persuasion, that the opinion of the vulgar is usually founded on misconception, or guided by caprice, and is therefore of little or no value. This is no doubt true, in respect of subjects either foreign to their interest, or too recondite for their understandings. But in matters of daily observation, and especially in those which particularly concern the interest and safety of all, there is perhaps no fairer criterion of truth, than the common judgment of mankind."

Mr. Jameson's argument is corroborated by the concurrent testimony of the whole body of the medical officers in Bengal, who have had an opportunity of observing the disease, who, without a dissenting voice, declare that it is not contagious.

To this unanimity of conviction, there were originally two exceptions; but from more enlarged experience these individuals have since modified their opinion.

But as neither the universal current of popular belief, nor the unanimous testimony of persons of the largest observation on the disorder, and most in the habit of weighing medical evidence, may be deemed sufficient to decide the point; let us see how far a belief in its contagious nature is consistent with the facts of the

case. It may then first be remarked, that the rise and progress of the disorder were attended by such circumstances as shewed its propagation to be quite independent of contagion. Mr. Jameson having traced its development in various parts of Bengal, adds "that it arose at nearly one and the same time, in many different places; and that in the same month, nay in the same week, it was raging in the unconnected and far distant districts of Behar and Dacca. It will not be argued, that the virus travelled, or was conveyed, over the many hundred miles intervening between the cities of Patna and Dacca, within a few days; since all experience proves, that where it really did appear to be communicated from place to place, conceding these facts to contagionists, as along the course of the Jumna, its march was exceedingly slow, scarcely averaging a few miles a day."

The distances and successive periods of affection, in a few instances, has been traced with great accuracy by Mr. Jameson. "To travel," says he, "from Allahabad to Cawnpore, a distance of perhaps 120 miles, the disease took from the end of March to the second week of April; from Allahabad to Etawah, 180 miles, a month; from Etawah to Futtihgur, 60 miles, fourteen days; from Etawah to Agra, 70 miles, a month; from Agra to Coel, 40 miles, ten days; from Agra to Delhi, 100 miles, 20 days; from Delhi to Meerut, 28 miles, nine days; from Delhi to Jeypore, 150 miles, a month; from Jeypore to the camp of the Rajpootana Force, 25 miles, fourteen days; from Jubbulpore to Nagpore, 180 miles, forty days." From this comparative statement it would appear that, admitting the successive propagation of the disorder, it observed no regularity as to time. The distances are, it must be observed, marked from conjecture.

But again, the whole habitudes of the disease, when once it had entered a town or camp, proved that it was not kept up by infection. Instead of daily increasing, and being perpetuated by the very means on which it fed, it invariably ran a regular course of increase, maturity, decay, and extinction. Thus in the centre division of the army, it began on the 7th of the month; was at its height from the 16th to the 22nd; declined to the end of the month, and finally disappeared about the 2nd

or 3rd of Dec. So in the left division of the army, it commenced on the 10th of April, was at its full height in the middle of the month; declined from the 21st, and died away before the beginning of May. The case of the Nagpore Force is somewhat different. The corps composing it fell at once into a medium already fully impregnated with the poison; and without passing through the primary stage, or that of increase, immediately had the disorder in its most violent form; the only effect of this change of circumstances, however, was to diminish the usual period of the revolution: for the disorder, which began on the 31st of May, had abated previously to the 5th, and nearly disappeared soon after the 18th of June. In the Rajpootana force, the sickly period was still shorter. The disease appeared on the 14th of Sept. and continued violent on the 20th, after which it gradually declined till the 1st of October, when it wholly disappeared. Lastly, in the Hansi division, it observed the same regularity of course; beginning on the 6th of August, increasing in severity for a time, and gradually becoming extinct towards the end of the month.

Now, this uniformity of rise and declension appears to be quite inexplicable, upon the supposition of contagion. For, if the virus were capable of reproducing itself, through the medium of the effluvia or secretions of individuals already infected; it must have gone on augmenting, until it either had no longer subjects upon whom to exercise itself, or was counteracted by some means more powerful than itself, as uncongenial seasons, or segregations, and the other prophylactic expedients resorted to on such occasions. Hence the supposed frequent necessity of seclusion, and of strict observance of all those regulations, which under the name of Quarantine Laws, have been in times of such jeopardy, devised to secure the general safety.

Had the form and progress of the present Epidemic suggested the expediency of similar safeguards, they would no doubt have been proposed and generally practised, wherever it appeared. But excepting the step wisely adopted in some of the camps in which the disease largely prevailed, of moving from the vicinity of the dead, in quest of higher ground and of a purer atmosphere; a

step which could have placed no check upon contagion, as many of the sick, and all the infected baggage, accompanied the moving body; no means of security whatever, was in any case thought of, all men being convinced of their being wholly unnecessary.

The opinion of the medical observer was, in all situations, founded upon his noticing that in his attendance upon patients labouring under the disease, he did not find himself, or his assistants, more liable to be attacked by it, than such persons as had no communication with the affected. Mr. Jameson gives us a very striking fact. From a medical list, consisting of between two hundred and fifty and three hundred individuals of the Honorable Company's Service, Bengal Establishment, most of whom saw the disease largely, only three persons were attacked, and only one death occurred. The fatal case took place at Barrackpore, a station very little visited by the Epidemic; the two others, which were not severe, occurred in the centre division of the army. There too, one of the Surgeons of His Majesty's corps was cut off; the only medical officer belonging to the king's service, known to have been affected. In Nagpore the Medical Staff remained, for several days, night and day, in the Hospital, and yet all escaped the infection. The observer did not attribute his escape to the effect of precaution, for he took none; nor to the limited nature of his intercourse with his patients, for the disorder, and the remedies employed in it, were such, that he was obliged to be constantly handling the body of the sufferer, and could not with safety leave his bed-side during the height of the attack. It might even be said, that in every case the patient and he breathed upon one another; so that, had the effluvium exhaled from the lungs or skin of the patient been truly infectious, even in the slightest degree, he could have had no chance of escaping. Next he saw, that where one member of a family was ill, the others were not more liable to get the disease than an equal number of individuals picked out from the general body of the community. This must be taken with some allowance; sometimes two or more members of one family were seized; but in such cases they were generally all taken ill together, were living in the same unwholesome situation, and had been previously exposed to some manifestly strong

exciting cause, as the eating of noxious food, sudden vicissitudes of temperature, and the like. In the rare instances, in which one fell ill at some distance of time after another, if we do not choose, says Mr. Jameson, to consider the concurrence as purely accidental, we shall be at no difficulty to explain it, upon remembering the depressing influence of fatigue, fear, sympathy, and grief, all powerful predisposing causes.

A very striking example of the non-communicability of the disease by contact, was afforded in Colonel Gardner's Irregular Horse, which was attacked at Kassgunj in the Dooab, in August, 1818. No two men were seized in the same hut, although, from twenty to thirty troopers slept in each. A case exactly the opposite of this occurred in Lord Hastings' camp at Gorukpore. A sepoy died of the pestilence. Five of the corps who had shewn no signs of illness, were employed to carry the body to the grave; they were all seized with the disorder during the ensuing night, and all died. This no doubt looks very suspicious; but then we know nothing of the concomitant circumstances, which, as in other instances of apparently dubious origin, might have been sufficient to do away every suspicion of the agency of contagion.

In camps where the general body was more compact, and the sick more numerous and crowded in smaller space, there was still ampler opportunity of confirming the truth of these observations. In no one instance were the dooley bearers, native compounders, or any other part of the large Hospital Establishments, although they were often so hard worked as to be scarcely able to stand from fatigue, more sickly than other descriptions of followers; nor did the soldiers, who constantly flocked to the hospitals to see and watch over their sick comrades, appear by that means to be more susceptible than others of the disease. Nor were those patients who were ill of other disorders, although always surrounded by persons in every stage of Cholera, therefore become more liable to be attacked; unless, perhaps, an exception be made in favor of convalescents, a class of persons always, from debility, much predisposed to fresh disease. In the centre division of the army, all this was particularly remarked; and during the week in which the Epidemic raged with so much fury, when the camp was a sick-ward, and every tent was filled or surrounded with the dead and

dying, the officers suffered comparatively very little. From a number that could hardly have fallen short of three hundred, only five or six deaths occurred. And it should be remembered, that at this time, officers of all description were equally exposed with the medical men; for the sick had become so numerous, that even the service of all was insufficient to tend them with proper care, and duly administer the requisite remedies.

Mr. Jameson next gives the results deduced from general experience, of the habits of the disease on a large scale, to shew whether they are strengthened by any such body of individual facts, as contra-indicate the infectious nature of the poison. There was only one difficulty, which was to choose the strongest from amongst a large number of instances bearing upon the point. He begins with the different divisions of the Army. "From the centre division, a few days previously," says he, "to the breaking out of the Epidemic, a small force, consisting of four troops of the 7th Regiment Native Cavalry, three light companies of sepoys, and the Dromedary corps, was detached on particular service in the neighbourhood. A short time afterwards, the remaining squadron of the corps of Cavalry was sent as a reinforcement from the great camp, in which the disease had then got head. It carried the virus along with it, and actually lost several men, after its junction with the foregoing detachment, which nevertheless, remained perfectly healthy throughout."

But there is yet a still stronger instance of the possibility of a diseased body joining a healthy one, without thereby communicating the infection to it. On the morning of the 11th of May, 1818, a detachment of 90 men, of the 1st Battalion 26th, marched from an inferior post, to join the main body of troops then encamped at Saugor. After an ordinary march, it halted in perfect health, half-way, under shelter of a few trees, on the banks of a small lake, situated in the midst of an open space, about three miles in circuit, and surrounded by low, woody hills. The whole remained well until the fall of night, when Cholera broke out amongst them; the first man was taken ill at midnight, and died in half an hour; several others fell sick within the next few hours, and before sun-rise, twenty out of the ninety, were overtaken by the disease. Although the Saugor camp was distant only five or six

miles, the detachment was too weak to move without assistance; the sick of the sepoys and followers, were therefore carried in by means of carts and doolies, sent from the main body; but before 11 A. M. when they got to their ground, five were already dead, and two others moribund. Next morning a man of the same party was seized in the act of scouring his accoutrements; he immediately became insensible, and expired in a few minutes. During the three succeeding days several others were taken ill, and before the end of the week, of the whole detachment, there was not a single man who had not been sent to the hospital labouring under Cholera, or other modifications of bowel complaints. The men of this party mixed promiscuously with those of the Saugor troops, and yet of the latter not one individual got the disease.

An instance of the same kind occurred in the Hansi division, except that here the party which escaped, went into the infected medium, instead of the pestilence being carried amongst them. When the disease was the worst with the troops composing this force, Casement's corps of irregular Horse entered the camp, and continued with the division during the remainder of the service, yet it did not at all suffer.

" It may be supposed," says the compiler of these facts, " that in these cases, the persons who escaped, owed their immunity to their not having been long enough exposed to the poisonous matter, or to some incidental peculiarity in their condition for the time being. But then, we shall find, that the same irregularity obtained, where those remaining unaffected, were for a long period surrounded by the supposed infectious atmosphere, and in all respects, similarly situated with others who suffered severely. Of the latter, a remarkable example was afforded in the left division of the army, whilst under the influence of the disease. Here the 7th Regiment of Cavalry, and the 2nd Battalion 13th Regiment remained entirely exempt."

Mr. Jameson, alluding to the foregoing says, " it is true that this and other instances which have been cited, may, in some measure, be accounted for, by the corps having earned exemption by previous exposure to the influence of the disease, whilst forming part of Colonel Philpot's detachment from the centre division."

The 2nd Battalion 1st Regiment had only three mild cases; while the 1st Battalion 14th and the 2nd Battalion 28th Regiments were greatly affected. The same partiality of affection here took place among different classes and descriptions of troops. The Golundaz, Gun Lascars, and Miners, were mildly affected; while the Pioneers, Drivers, &c. who had undergone the same vicissitudes of weather and fatigue, were not at all touched: some corps also lost more than a hundred, others only three or four men. This could not arise from separation, or difference of situation and diet, for all used the same food; and there was constant intercourse as well as daily change of ground. The same observation may be extended to the Rajpootana force, of which the right suffered more than the left portion. In the Furruckabad lines, the Jail and the Artillery Barracks, the former containing six or seven hundred prisoners, subject to great privations and daily worked in the sun, upon the roads, and the latter inhabited by 100 Europeans and 250 natives of the 12-pounder experimental Brigade, had not a single case; whilst the levy corps suffered severely.

Mr. Jameson relates, that at the station of Allahabad, there was something yet more to our purpose. For of 400 supernumerary Invalids, assembled there for examination by the annual Invaliding Committee, not a man was affected; although they were living under perfect similarity of circumstances, in the lines of the regular Invalid Battalion, the men of which in fourteen days had 50, of 680 their total number, sick of the disease. So, while the disease raged virulently at Banda, not a man belonging to the 2nd Battalion 3rd N. I. stationed there, was affected. At Hutta, again, a healthy town on the banks of the Sonar, in Bundlekund, the epidemic committed such ravages, that the inhabitants fled and took refuge in the neighbouring villages; and so virulent was the poison, that the Sepoys and seven camp-followers of the 2nd Battalion 1st Regiment were seized, merely on that corps marching through the place. And yet the disease never appeared amongst a company of Sepoys, or their followers, then in the fort, which was divided from the town only by a broad street. What here served to screen these men from infection? Certainly, no suspension of intercourse between the town and fort; for this

always remained free, much less superior salubrity of situation, for the fort was small, and crowded with buildings, and the town high and open. Thus too, whilst the disease raged in Saugor, and in the lines of the 1st Battalion 26th Native Infantry, about a mile and a half distant, not a case occurred in the fort, in the centre of the town, which was then garrisoned by 200 men of the 2nd Battalion 1st Regiment. In like manner, in Kotah, three companies stationed in the fort, escaped entirely, whilst one hundred persons were daily perishing in the town. And at Mahidpore, when the Epidemic prevailed in the vicinity, and was daily attacking a detachment of Bengal troops, consisting of part of the 1st Battalion 6th Regiment Native Infantry, two Regiments of Skinner's Horse, and 1,500 camp-followers, it entirely spared a body of 500 of Holkar's Reformed Horse, although the two camps closely adjoined, and a man who had been sent in from the Bengal division, after getting the disease, went through every period of it amongst the healthy Mahrattas. If the virus were capable of being procreated by contagion, Mr. Jameson very properly infers, that the poisonous particles emanating from the body of this infected person, would have been sufficient to support and diffuse it all around. For this corps, having an infected person in the midst of it, was then, except in respect of numbers, in the precise situation of the larger divisions of the army, in which the disease always began with one or two unconnected cases.

In citing this great variety of evidence, which has been drawn in support of the doctrine of non-contagion, from the general progress of the disease through the districts and towns successively visited by it, one case given by Mr. Jameson is too remarkable to be passed over. Of the cluster of islands lying near the main land, as the Ganges discharges itself into the Bay of Bengal, Sundeep, a large and populous place, remained quite free, whilst the islands of Deccan, Shahbazpore, Huttiah, and Bomney, were ravaged between all.

The following interesting abstract of a communication to the address of the late Superintending Surgeon Law, on this establishment, from my able friend Mr. Clarke, late of Monghyr, will afford me evidence from which it may be satisfactorily proved that the Epidemic Cholera is not contagious:—" We

left Cuttack on the 10th of January. During that month and until the 2nd of February 1821, the weather was natural and agreeable; it then became hot, with sultry nights, and occasional hot wind in the day. It was a plain country between Raypore and Nagpore. Our supplies, although hitherto not over-abundant, were sufficient. About the 2nd of March, the weather became cloudy, with lightning and showers of rain and strong wind, which for the time, cooled the air, which was generally very healthy. On the 5th of March we left Nagpore; the morning was very cool, with the wind from the N. W. and in the evening it was cloudy, with lightning. About 12 at night, a Sepoy was taken ill, with severe purging and great exhaustion, and about 2 A. M. he was dead. Nature sunk under the first attack, and never made an effort at reaction. On the 6th, we made a very long and hot march, to enable us to reach a village, where supplies had been collected. It may not be foreign to the subject to mention, that almost all the way from Nagpore to Baitool, supplies were scarce and dear; and even Chunna, and other kinds of pease, were with difficulty procured; and I have often seen the most unwholesome grain voided in the same state as it had been swallowed. Two days before, Otta was very scarce, and much difficulty was experienced in getting as much rice as would make congee for the sick. On the evening of the 6th, we had a severe storm, with much heavy rain, and the Thermometer suddenly fell from being 96° in single-pole tents, at noon, to 56°; at 7 P. M. a Havildar, who had been taken ill some time after leaving our former ground, in the dark, was not observed, until the rear guard came up; and before he arrived in a Dooley*, at 7 P. M. the energies of the system were completely exhausted, and death took place in ten minutes after, without his being able to obtain any medicine. The morning of the 7th was very raw, damp, and cold; the Thermometer at 3 A. M. was 54°. In the course of this day, we had two sepoys taken ill. The morning of the 8th continued raw and cold; Thermometer at 3 A. M. 53°: cloudy to-day. On the march, found many of the men lying on the road, complaining of pain and distention of stomach, which they attributed to improper food; almost all the officers complained

* A conveyance for the sick.

of slight indisposition, with disordered stomach and bowels, and a tendency to looseness. At 11 A. M. it became very cloudy; Thermometer 72° P. M.; commenced raining very heavily, and continued to rain incessantly until 11 P. M. On the 9th we halted; the day was cold and disagreeable; not a sound could be heard, but the groans of the dying, and screeching over the dead; many of the camp-followers, who had no covering from the elements, died during the night. We had several fresh cases in the course of the day; much variety occurred in the kind, order, and sequence of the symptoms; purging was generally the earliest and most frequent occurrence; then vomiting and the spasms; in many cases the virulence of the disease was so painful as to prove almost immediately destructive of life, the vital powers being at first overwhelmed and nature incapacitated from any successful attempts at reaction. It would be adding nothing to the general stock of information, were I to detail the cases and casualties of each day. Upon an average, we had four or five cases every morning, for they were generally taken ill at night, or early in the morning, until our arrival at Baitool. An the 13th, at Mooltye, and some other villages, in the neighbourhood, there was a considerable mortality. At Mooltye alone, 50 were said to have died in the course of one night; but the Sepoys on duty were perfectly healthy, and had no cases of the disease among them. In seven days after our arrival at Baitool, the weather continued very cold, and the new cases were violent, and of the same character as those we formerly had, until the 19th, when the weather became warm, and all those taken ill after that date recovered rapidly."

First, then, it appears from Mr. Clarke's account, that from the 2nd of February to the 2nd of March, the weather became hot, with sultry nights, yet the corps was free from the disease. Next, the weather became cloudy, with showers of rain, lightning, and strong wind, which for the time cooled the air, which was generally healthy. The weather appears to have continued cool, with the wind N. W. till the 5th, the evening of which date was again cloudy, with lightning. It was now that the first case of Cholera occurred. Since it appears that the disease was raging at Nagpore when this corps passed, and that (as I shall show) it continued not only

with this, but also with another corps which followed it a month after, it will be necessary to dwell upon the fact just noticed. Those who are inclined to believe in the contagious nature of the disease, assume this as highly corroborative of their position. From the circumstance of the disease prevailing at Nagpore, and, of this corps having been free from it, until arriving at that station, they infer, with a degree of plausibility, that the communication of it to this corps was from thence, either by the intercourse of people, or through the medium of the atmosphere; and this supposition is apparently strengthened by the very circumstance, strange as it seems, of the disease continuing to increase in virulence, and remaining with the corps for a number of days after its march from Nagpore. Facts of an opposite nature, however, strongly militate against this conclusion. The 22nd Regiment followed the footsteps of the 30th, and were affected with the Cholera at a village where it was quite unknown, six days before they reached Nagpore. On their reaching that place, although the disease raged there with violence, the cases among them were neither more aggravated nor more numerous, which, it may be presumed, would have been the case if contagion existed. The Regiment, besides, had only an individual case daily, until they reached Hussingabad. The day on which they arrived there, they were free from the disease; but on the following day 20 cases were admitted. None of these facts will in the least countenance the idea of contagion.

Its non-contagious nature is further strikingly manifested by the following circumstances. In Dec. 1819, the 24th Regiment N. I. marched from Agra, in progress, to relieve the troops at Mhow; and though the distance between the two stations was great, the corps continued free from the disease, till they arrived at a village within one march of Mhow, where they were first attacked, but in a mild form. The 1st Cavalry followed that regiment from Muttra, passing through the same village; but notwithstanding that they were more liable to be attacked by the disease than a corps of infantry, in consequence of the number of followers being twice or thrice as great, they escaped with impunity; whereas the 2nd Battalion 26th Regiment, which followed a fortnight after, were attacked at the very village at which it showed itself in the 24th Regiment, the disease proving of the violent form and of a fatal character. Can

any fact be adduced of a stronger kind than the above, to lead the inquirer to question the power of the Epidemic being communicable? Even the case of the 22nd does not lessen the probability, because a contagious disease may always be communicated five marches distant. But the remarkable circumstance of the 24th Native Infantry having had the disease mildly, obliges the contagionist at once to conclude, that the virus was not sufficiently powerful to produce the disease of a nature to be regarded; in consequence of which, they suppose the Cavalry to have been exempted.

It would appear from what our opponents understand of the nature of the contagious principle, that persons who are exposed to the influence of it, may not have the disease produced in them sometimes for six weeks afterwards, the poison meanwhile concentrating into violence until sufficient to develope itself. They affirm that disease commuicable by contact has become known two months and a half from the period the constitution became liable to the contagious principle; and it is by this supposition that they explain the fact, that when the 26th Native Infantry followed the 24th one month after the latter, this last corps escaped with a trivial attack, whilst the former had it in all its virulence and fatal character. But their principles may be marked more strongly from another circumstance still more striking than the preceding. After the departure of the 22nd Regt. from Nagpore, that corps kept up the disease in a single case daily, till they reached Hussingabad. Whence it is deduced, that the infection was in the corps; else why should it develope itself, although but in a single case daily, when they changed ground, and I may say climate, daily? How analogous soever this circumstance may appear, and how much soever capable of being adduced in support of contagion, clinical facts render the non-contagious character of the disease, indubitable. When the 30th Regiment (vide Mr. Clarke's letter) first got the disease, it increased to so great a degree of violence that on the 8th of March he found many of the men complaining of pain and distention of the stomach; and on the 9th not a sound could be heard but the groans of the dying and screeches over the dead. In this instance there is seemingly some analogy to show communication by contact, the disease having appeared in this corps only a few days before, and the virus having concentrated and increased in

violence daily. It would, indeed, have been confirmatory, had not the same letter refuted the supposition; for it says, that at Mooltye and some villages in the neighbourhood, there was a considerable mortality, and that at Mooltye alone 50 were said to have died in the course of one night, while the Sepoys on duty were perfectly healthy. The conclusion is therefore undeniable. For, had this disease been infectious, how was it that the Sepoys on duty at the very village escaped? Mr. Clarke also says, that he only had, on an average, four or five cases daily. Now in a corps which has upwards of a thousand men, besides followers, would not more have been affected, on the supposition of the existence of contagion?

Referring to the period when the 22nd Regiment was affected with the disease 19 days, we find that previous to the 5th, it was mild and easily cured. Would it not be assumed, that the disease here was communicated mildly in the first instance, that it took 19 days to concentrate into a virulent and fatal character, and that it was not till the 5th that the poison was formed, sufficient to excite the disease of a violent nature, in 20 cases in one day? It is a remarkable fact, however, that of these 20 cases, the men belonged to separate companies; that is to say, only one man was affected out of each company. Since, of the ten companies of which a corps is formed, each company is cantoned distinct from the others, would not the contagion, had the disease partaken of that nature, have first spread through one company, and destroyed it before it proceeded to another? Besides, every sick man had a comrade to lie by him, bed to bed, and to attend upon him, and even to wash and clean him after stool; yet it is well ascertained that not one of these men was affected by that close contact which was from their situation unavoidable, any more than the Sepoys of the guard and the hospital attendants.

There was a Battalion of Infantry on each side of the 22nd, yet they continued free from the disease. One case of Cholera appeared in the 21st Native Infantry, at Hussingabad, on the 2nd of April, two days before the 22nd arrived; and with that single case it stopped. These are facts obviously opposed to every principle which assumes that the disease is of a contagious nature.

To strengthen my position, I refer to the circumstance of the 24th Native Infantry being affected on their march from Agra,

and getting the disease within one march of Mhow, a station where there is a large division of the army. If it is true that contagious diseases, according to received opinions, will follow a large army in preference to small ones, from the circumstance of numbers of people being crowded together, how was it then that this large army continued free from the disease, when it was raging in a village within ten miles of them? How was it too, that the disease, so far from being communicated to this army by the 24th Regiment, left that corps entirely three days after the junction? If it be said that the disease was mild and easy to be subdued in the 24th, and not violent enough to excite contagion, it must be observed that when the 1st Cavalry, marching through this village 9 days after the 24th, escaped with impunity, the disease, had it been infectious, ought to have been communicated to the corps, since it had had nine days to increase in violence. The 26th Regiment, a fortnight after the 1st Cavalry had passed through this memorable village, was attacked by the disease, which proved of a fatal character. The 26th got the disease in one day, and joining the army on the following day at Mhow, free intercourse was kept up, but no other troops were affected in that army in consequence. Hence it is a legitimate inference that the disease was not contagious.

At Segowlee, a village on the Nepaul Frontier, distant 14 miles north of Bettiah, was a detachment consisting of upwards of 300 of the Chumparun Light Infantry. Not a case appeared in this detachment, although the Epidemic prevailed in every village around them. The same circumstance occurred at Hussingabad in 1820. A corps in the centre of cantonments was affected, and the surrounding corps continued free from the disorder. The year before, at the same place, the disease attacked a corps on the left of cantonments, passed that in the centre, and attacked that on the right. I was informed by a very able medical officer on this establishment, that he knew of a village on the Nepaul Frontier, where one side of a street was subject to the disease, while the opposite side escaped from its influence.

From personal experience, I feel satisfied that the notion of the Cholera being contagious is quite unfounded. I breathed the atmosphere of my hospital in the centre division of the grand

army, where were the most distressed and the poorest classes of people, morning, noon, and night; yet neither myself, nor any of the attendants were affected. During this time I have also visited officers on the staff whose tents were adjacent, but I never communicated the disease to any.

Those, however, who have written on contagion, advance, that some constitutions are not susceptible of contagion in any way, yet they may become the medium of communicating it to others. We ought to be cautious in maintaining opinions which suppose contagion in so remote and equivocal a manner as this, knowing the alarming consequences of such a belief. Through fear of contagion the sick may be forsaken and die for want of proper care; hospitals may become crowded, and cleanliness neglected for want of attendants, and thus a diseased atmosphere induced.

It is a point in doubt whether even the plague be a disease communicated by contagion; and the assertion that it is not, is made most undoubtedly on rational grounds.

The plague prevails in a town, it is said, in proportion as decaying matter is permitted to remain on the surface, or is retained by the earth; but if a town be well cleaned and well drained, the existence of the plague is destroyed. If such be the case, it is a fair deduction that the plague, as it was communicated through the atmosphere, was not contagious, but made so by the very means that were taken to prevent its spreading, viz. the confinement of every inhabitant of a pestilential house to his own habitation, and compelling all the members of the family, whether labouring under the disease or not, to remain shut up, until they recovered or died;—a sufficient cause in itself to produce a pestilential atmosphere, and consequently great mortality, if not from disease, from depression of mind.

To remove diseases of a pestilential nature, it is known to be a *sine qua non*, that there must be a removal from the sickly spot, free ventilation, and cleanliness; these are the only sure means of prevention, and without these all attempts are unavailing. This has been fully proved in the instance of small-pox. It is not many years ago since it was the custom to preclude patients even from the benefit of the common atmosphere in their sick apartments, from the groundless terror of contagion. This error

has been discovered, and the disease rendered astonishingly mild by allowing to them open and airy apartments; and now it seldom spreads. And although I may excite astonishment and perhaps animadversion for the boldness of the declaration, I do not hesitate to state it as my opinion, that the decrease of the small-pox of late years is as much attributable to careful draining, cultivation, cleanliness, and our late improvements in habits and polity, as to vaccination. It is admitted, that pestilence is generated during calms, when a vane is not observed to change its direction, and when there is a want of the purification of the atmosphere through its not being agitated by fresh currents of wind. This stagnation contributes to the concentration of the virulence of infection; and the more so, where numbers are congregated, and confined to their particular habitations, about which filth is permitted to accumulate.

Medical men differ much in their opinions respecting the communication of infection through effluvia or contact. Dr. Russel is not decided on the point. Dr. Blackburne advances very positive proofs of infection not being communicable. Dr. White, with perfect security, visited and came in contact with pestilential subjects on board the transports, where the infection was violent, though he died on entering the pest-houses, in which the poison was more virulent.

It will be of great importance to humanity to establish the principle of non-contagion, inasmuch as pestilence is readily removed when communicated through the atmosphere, by removing the sick, and dividing them into small parties, which renders effluvia inert; whereas, if it were communicated by contact, it would be impossible to destroy it. Thus Dr. Chisholm inquires, why malignant and infectious fevers are never or very seldom generated on board of slave ships? In these the number of persons is much greater than in transports, or ships hired for the purpose of emigration. In order to prevent insurrection, the slaves are generally kept below, sometimes in irons, particularly during the night. The smell between decks is intolerably offensive to those not accustomed to it. Infection, however, is prevented, where so many causes combine to produce it, by the following means. The crew of a slave-ship is generally very numerous, whereby the risk, should insurrection happen, is much less, and the

attention to the slaves is proportionably increased. The space between decks is regularly washed; the slaves are in parties of thirty or forty taken on deck in fine weather; their irons are taken off, and they are encouraged by every possible means to exercise themselves by dancing. They have no clothing to which infectious particles can adhere; their persons are frequently washed; their diet is always composed of vegetables without any mixture of animal food, and seasoned highly with capsicum; their drink is water. By means of wind-sails, when they can be used, a constant change of air is kept up in the ship, and as free a ventilation as the situation can admit.

As proof, however, that the virus of contagion is germinated by the congregation of numbers, and neglect of cleanliness, as well as inattention to the comforts of the sick, I quote some of the incidents which are recorded as having transpired in Florence. It is stated that when any one died, it was the custom in that city for the females, relatives and neighbours, to meet at the house of the deceased, and unite their lamentations with those of the family. The men also used to assemble before the door, the clergy attended, and the deceased was carried to the grave by persons of similar age and rank in life with himself, and interred with honours suitable to his station. As the malignity of the pestilence increased, however, all these observancecs were laid aside: the victims often breathed their last, not only without the consolation of female kindness, but for the most part alone and unheeded; and few indeed were those whose graves were bedewed with the tears of their neighbours and kinsmen. Instead of these decent solemnities, it was deemed necessary to keep up the spirits by jesting and laughter; seldom was there a funeral that was attended by ten or a dozen persons, and the corpse, intead of being supported by the most respected and estimable of the citizens, was carried hastily to the nearest church, by men hired from the dregs of the populacc, and then deposited in any grave that happened to bc open, with little or no religious ceremony. As for the middling and lower classes, whose means of procuring assistance werc more limitcd, they sickened and died by thousands in a day, expiring in the streets or in their solitary dwellings, where the stench of their putrefying carcasses first communi-

cated to the neighbours the intelligence of their decease: self-preservation compelled the latter to drag them out, and any person walking along the streets in a morning, might have seen innumerable bodies thus exposed at the doors of the houses. They were afterwards carried away by two or three at a time, on tables or any thing that could be procured, the same bier often containing a whole family. If a procession passed, bearing a corpse to burial, it was presently joined by a number of others, and the priests on arriving at the cemetery, found that instead of one funeral, they had ten or a dozen to attend to. It being thus found impossible to keep pace with the rapid progress of the mortality, the consecrated ground no longer affording room for separate interment, large pits were dug, into which the dead were promiscuously thrown by hundreds, and stowed in tiers, like merchandize in vessel. In this state of things, the death of a human being was no more regarded than that of a dog. The sick were forsaken, and of course a contaminated atmosphere strengthened the epidemical influence. Here is a contagion generated by neglect, and a picture is exhibited, which shews the extreme danger of promulgating such a doctrine.

Another predisposing or exciting cause is likewise induced by the principles of contagionists. No one will deny the influence which the mind has over the body. Without entering into any metaphysical inquiries concerning the mutual relation subsisting between the mind and body, and the influence the one has over the other, it is sufficient for our present purpose, that the fact of such relation and influence is indisputably established by universal experience. I could adduce from writers, both ancient and modern, many interesting particulars tending to illustrate the fact, and shewing the opinions which metaphysicians and physiologists have entertained upon the subject.

The exercise of the powers of the mind, we may regard as having an influence in the prevention of diseases. If the mind be kept in a state of constant cheerfulness, the blood freely circulates through every limb, a proper degree of perspiration is kept up, while the bowels and whole glandular system continue in a state of healthy action, a tone to the stomach is given, and the whole constitution is strengthened. It is known, that in the case of the

tooth-ache, if we allow our minds to dwell upon it, the pain becomes intolerable ; but if our thoughts are employed upon other subjects, and we behold the operator ready to extract it, we are not so sensible of the pain. An eminent writer has observed, that all passions, of whatever kind, if they rise to a high degree, have a dangerous tendency; bodily disease, nay death itself may be the concomitant effects. Fatal apoplexies have frequently followed sudden dread or terror; catalepsy and epileptic fits not rarely accompany immoderate affliction, or distressing anxiety. Hypochondria, hysterics, and habitual dejection, may indeed arise from a variety of physical causes; but they are as frequently generated by the passions or sufferings of the mind alone, in other individuals otherwise healthy.

Dr. James Johnson has ably discussed the influence of the mind over the body. Speaking of the passions, he observes: "These various emotions are to the mind, what the various species of food and drink are to the body. They stimulate, they depress, they tranquillize, and they ruffle the soul; but what is more to our purpose, they produce the same effects on the body. Examples of this are every moment before our eyes. The vascular and nervous systems are perpetually under the influence of the mental emotions. What palpitations and tremors are every morning excited by the postman's rap, when we are in anxious expectations of intelligence from absent friends! How often are we hardly able to break the seal of important letters! The effects of the mind on the circulation of the blood were early observed; instance the detection of Antiochus's passion for Stratonica, by the pulse. But it is not on the heart and large vessels only that mental emotions operate; the minutest capillaries feel their influence: let the idea of shame cross the imagination of sensibility, and instantaneously the capillaries of the cheek are gorged with blood: let the emotion be changed to fear; quickly the lily usurps the rose, and the vessels of the face are blanched and bloodless. Hildanus relates, that a man, disguised as a spectre, seized another suffering under a paroxysm of gout, dragged him down stairs, with the gouty feet trailing along the ground, and left him on the cold earth. The gouty patient, finding himself deserted by the supposed ghost, getting on his legs, sprang up stairs with infinite

agility, and from that moment never afterwards felt a symptom of gout. On the other hand, terror has often produced such a sedative effect, as to arrest, at once the circulation of the blood, and cause instant death. A Jew in France, says Ludovicus Vives, (lib. 3 de Anima,) came by chance over a dangerous passage or plank, that lay over a brook, in the dark, without harm ; the next day, on viewing the perilous situation he had been in, he fell down and died."

"But the corporeal effects of mental impression are not confined," continues Dr. Johnson, "to these violent emotions or passions. The imagination alone is capable of producing equally wonderful phenomena in the material fabric. The animal magnetism of Mesmer, and the metallic tractors of Perkins, though mummeries and impositions in themselves, effected real cures, and induced many of those extraordinary sensations described by the patients and dupes. Thus an eminent physician at Paris pretending to a lady that he was an adept in the art, made so evident an impression on her by the preparatory solemnity of voice and gesture, that by the time he carried his hand to the region of the heart, he felt that organ palpitating violently. Oppression and tightness of the chest followed, the muscles of the face became convulsively twitched, her eyes rolled, syncope supervened, and the contents of the stomach and bowels were evacuated. It is an inexplicable fact, that our attention being strongly directed to any particular part of the body, will frequently cause what is called a determination of blood to that part, with various unaccountable feelings there. It is by the knowledge of this fact that we have a clue to the cures of Mesmer and Perkins. Thus Dr. Haygarth, in Bath, and Mr. Smith, in Bristol, having formed mock tractors, and applied them with all due form and solemnity to patients labouring under chronic Rheumatism, were assured by them that the greatest relief was obtained by drawing the painted pieces of wood over the affected limbs. It is in this manner that amulets, incantations, and charms, have indubitably produced, in the times of ignorance and superstition, many of the now almost incredible effects recorded by them ; they have lost their power by the diffusion of knowledge, but the principle is still in action, though under different forms. Thus, during the siege of Breda, in 1625, when the garrison was on the point of surrendering to

the enemy, from the ravages of scurvy, a few phials of sham medicine were conveyed into the fortress by the Prince of Orange's orders, and distributed among the scorbutics, in doses of a few drops, as the most valuable and infallible specific. The consequences were, that the mental energy inspired by confidence in the medicine, worked miracles. Such as had not moved their limbs for a month before, were seen walking in the street, sound, straight, and whole. Many who declared they had been rendered worse by all former remedies, recovered in a few days, to their inexpressible joy. The influence of imagination, through the medium of certain passions, as faith, hope, &c. over human infirmities, is probably wider and greater at this day, than in the darkest ages of ignorance. With the progress of Medical Science, its real cultivators have multiplied to a vast extent, and soi-disant professors have exceeded all calculation and belief. In the former class, when merit, chance, good fortune or other circumstance establishes a reputation for superior skill, the efficacy of the prescription is infinitely enhanced by the patient's confidence in its power; and thus one physician will cure a disease with precisely the same remedy which entirely failed in the hands of his less celebrated contemporary. 'Plures sanat, in quem plures confidunt.' (Cardan de Sapientia.) Hippocrates makes the same remark; and Avicenna says, 'Ægri persuasio et fiducia omni arti et consilio et medicinæ preferenda.' It is in this way that the magnificent and unqualified promises of the charlatan inspire weak minds with extravagant expectations, and actually, in some rare instances, produce those marvellous cures which we hear trumpeted forth; and those too by drugs either totally inert, or diametrically opposite to the views of even the quack himself.

Sunt verba et voces quibus hunc lenire dolorem
Possis, et magnam morbi depellere partem. Hor.

"As the nervous and vascular systems are so particularly under the influence of the mind, we may readily," continues Dr. Johnson, "form some idea of the wide range of effects resulting from the various and almost unlimited play of the passions among so thinking and so reading a people as the English nation.

"Corvisart observes, that diseases of the heart were extremely common in the times of the French Revolution, when the minds

of all classes were kept in a constant state of agitation and alarm; and the attentive physician may daily observe both disordered action and disordered structure of the heart resulting from mental causes. With the progress of intellectual cultivation, civilization, and refinement, a host of what may be termed predispositions to disease, have arisen, that lay us at the mercy of almost every breath of heaven."

If such then is the influence exercised by the mind over the body, can we any longer doubt that the ravages of the plague, have been occasioned by accumulation of sick and by the pernicious effect of terror and alarm? Hence, when the Epidemic first broke out in the centre division of the grand army, and two of the senior medical officers, gentlemen whose opinions had great weight, declared it to be contagious, I withstood them, knowing what would be the fatal consequences, if such a doctrine were once established. Fortunately, the Marquis of Hastings at that moment published my letter in general orders, wherein, my readers will recollect, I maintained unequivocally the non-contagiousness of the disease. I trust it had its effect in removing all doubts upon the subject, and establishing that opinion which is now universally entertained. I hope the day is not distant when the doctrine of contagion will soon be denied in every part of the world; and that the contentions of its followers on this important question, by which the science of medicine has been agitated from the remotest ages, may cease for ever; for, in the words of Jackson, sect has contested with sect, and system been opposed to system, with a zeal more devoted to the ascendancy of party than the triumph of the cause of truth. Baglivi, lamenting the consequences of these discords, invokes the interference of Heaven, "tantas componere lites," for the benefit of mankind and the good of the Christian republic.

Has inter medicos pugnas et controversias rogo Deum Optim. Max. ut in magnum humani generis, et præsertim Christianæ Republicæ commodum componere velit, quo medicina tot retro sæculis miserè jactata, in placido tranquillitas et concordiæ portu conquiescat*.

I am happy to see that at length the first step towards the removal of these delusions has been taken. I allude to the

* De Praxi Medica, p. 6.

recent declarations of eminent physicians respecting the character of Yellow Fever, which has been hitherto considered to be infectious. It is with heartfelt satisfaction we learn, that towards the end of last year, a French physician of the name of Chervin, returning to Europe after very extensive travels, and convinced that the Yellow Fever was not contagious, addressed a petition to the Chamber of Deputies, praying the postponement of the formation of several sanitary establishments, at that time in contemplation. The Chamber referred Dr. Chervin's petition to the Minister of the Interior, who again referred it to the Academie de Medicine. A Committee was appointed to investigate the subject. By the report which that Committee has recently made, it appears, that Dr. Chervin had visited all those parts of America, in which the Yellow Fever exercised its ravages; and had carefully interrogated the practitioners of medicine with respect to the mode in which the malady was transmissable. Six hundred and eleven documents, having every possible character of authenticity, were furnished by five hundred and thirty-one medical men, of whom four hundred and eighty-three do not believe that the Yellow Fever is contagious, and only forty-eight maintain the opposite opinion. Dr. Chervin also collected other documents in the various parts of Spain, which were the theatre of the memorable Epidemic of 1821. They are not less favourable to the sentiments of the non-contagionists. The Report concludes by declaring that Dr. Chervin's documents are entitled to the most serious attention of Government.

SECTION IV.

EXCITING CAUSES.

It is well known, that the most healthy atmosphere is a dry atmosphere. In India most of our old officers will declare, that they enjoy much better health during the hot winds than at any other period of the year; an opinion established by experience, and easily accounted for. If we respire dry atmosphere, the egress of air abounds with moisture from the lungs, which moisture is carried off by the atmosphere. The morbid perspirable vapour also, is in like manner carried off by the dry atmosphere, leaving us cool and pleasant; the body thus enjoys an equable temperature, and is not susceptible of disease. Epidemic diseases seldom prevail during a dry atmosphere; in fact we enjoy at this period the best health. Prevailing Epidemics, however, occur when the atmosphere changes; and the more sudden the change, the more violent and general the Epidemic.

If the air becomes moist and cloudy, it ceases to take up the perspirable morbid humour from the surface of our bodies; on ceasing to respire a dry atmosphere we are unable to get rid of the morbid moisture from our lungs by expiration, and a morbid humour or cause forms in our system in consequence: nature, in this state of things, determines all to the bowels; and the bowels having too much to perform, disease is the result. For it must be evident, that when the morbid humours are retained in the lungs and surface, and not carried off by the atmosphere, they must be determined to the centre, and produce disease of an Epidemical nature. Where so many are exposed to one cause, we may surely expect great numbers of sick. Here is a cause, that will produce the most violent Epidemics, though it cannot be inferred from hence that they are contagious. The well tried usefulness of fires, where pestilence exists, in destroying the cause, is a confirmation of what I now assert; and the advantage erroneously supposed to be derived

from smoking cigars, by promoting an egress of moisture from the lungs, substantiates the argument. The circumstance of the poorer classes being badly clothed, and being more liable to be affected, from being more exposed to the cause, evinces the principle to be a fair deduction, not from theory but experience.

From the evidence which has been afforded under Section II. in proof of humidity in the atmosphere having abounded during the prevalence of the Epidemic, it appears to be exclusively on the occurrence of great and sudden transitions in the weather; it being a law of our system that any new impressions made upon it, changes its actions and disposes it most generally to take on those in a greater or less degree of a disordered nature.* A climate permanently moist has not the same effects: hence the Hollander, enveloped in perpetual fogs, is one of the most vigorous of his species; while the Italian, who lives under a sky of perennial brightness, is puny, cadaverous, and sickly. Humidity, therefore, under such circumstances as those exhibited in the section already referred to, operated beyond dispute as one exciting cause of Epidemic Cholera, by inducing a chilling and collapse on a skin which had been freely perspiring, and by being promotive of those deleterious exhalations from putrified animal and vegetable matter.

Dr. Dickson, in his account of an Epidemic at Charleston, remarks, "that the alterations of temperature were great, the wind setting in from time to time from the Eastward, blew cold and keen, and gave rise to numerous Dysenteries and forms of gastric and intestinal disease." He adds, "that the greatest falls of rain he ever remembered, occurred; the low grounds were overflowed, and the earth thoroughly soaked, which after repeatedly emptying them continued to collect again.' After the occurrence of these premonitory circumstances, it became the common remark with one of the old inhabitants, to Dr. D., that he could foretel an unhealthy fall by the permanent fulness of his well. "The heat and moisture of our climate," says this physician, "are abundantly exciting causes of Fever. The miasmatic exhalations from the low grounds of our rich alluvial country was a poisonous agent, the influence of which is determined to the mucus surface of the stomach and intestine, on subjects liable to its noxious power, and in these interferes with

* See Chapman on Epidemics—Phil. Jour. 1824.

and destroys the dispositions to the regular revolution of febrile periods."

Dr. Heldreth, in his remarks on the Epidemic Fever, which appeared at Marietta, in the State of Ohio, in 1822 and 1823, also observes, "that the whole country was deluged with rain through the months of June and July,* with very little thunder and lightning, and no heavy winds. The wide bottoms on the Ohio, and all the tributary streams were filled with water, wherever there was a low or sunken spot to hold it. Many acres of Indian corn were entirely ruined by the excessive wet, and many fields of wheat lost after having been through the hands of the reaper. Grass suffered in the same way. The low lands exhaled noxious and fœtid effluvia, so potent in many places that the passengers were obliged to make all haste through these disgusting spots. In passing from the high lands to the bottoms, these fœtid effluvia could be perceived for some distance among the hills, especially if the wind blew moderately in that direction. Even the flat lands on the heights, if covered with a growth of grass, exhaled the same vapour. I have been told by several intelligent farmers, that in ploughing amongst their corn in the rich bottoms, the earth, instead of that grateful odour, which usually arises from fresh ploughed land, sent forth a disgusting, sickly smell. The whole surface of the ground seemed to be in a putrid state from the want of a sufficiency of sun-shine to dry and sweeten it. The last day of August, the rains ceased, and the weather was dry the rest of the season; but the systems of the inhabitants had become so charged with miasmata, that the change of the weather had no influence on the progress of the Epidemic."

Dr. Harrison, who wrote on the Epidemic which prevailed in Louisville, Kentucky, and its vicinity, in 1821 and 1822, in like manner remarks, that "the summer and fall of 1819 and 1820, were remarkably healthy, and very dry, but the weather was as warm as that of the subsequent years. In each of these years little rain had fallen in the spring and early summer months. The

* The only part of the state, east of the Scotia river, that remained healthy, was a district of country embracing New Connecticut, and extending in that direction from lake Erie to the Ohio river, where it was very dry, and the inhabitants entirely escaped Fevers.

ponds in and near the town were evaporated and quite free of water before the first of July in each year. Even in the pond district of the country there was little or no stagnant water. The river was low during both of the summers of the above years, and there was deposited on the shores and rocks near the town, a considerable quantity of drifted wood and other matter, left by the subsidence of the river and creeks. During the spring and early summer months in 1821, we had an immense quantity of rain; the ponds were all overflowed, and the earth thoroughly saturated with water. It was early apprehended from the great quantity of water on the surface of the earth, that we should have a visitation of Bilious Fever. The summer was warm, and the atmosphere pretty well perflated with currents of air, but the wind came from the south-west, sweeping over the pond district of the country. The south-west is our prevailing summer wind, and has to cross this tract of marshy lands before it reaches us. This marshy tract of country is thinly inhabited; the hand of cultivation has cleared only a small portion of its and a thick forest of tall trees spreads over the ponds and marshes a deep shade, through which the sun scarcely penetrates. This pond settlement was greatly afflicted during the summer and autumn of 1821."

In noticing Guinea, Lind says, "this has, properly speaking, only two seasons, the wet and the dry. The former is commonly of about five months' continuance, and is the season of sickness; whereas, for many months in the dry season, most parts of this country are equally healthy and pleasant with any in the world."

"Disease is produced by rains in other modes, (says Dr. Chapman,) they sometimes act by washing off, or mechanically destroying the green pellicle or coat, which lies on the surface of stagnant waters, excluding the sun, without whose influence miasmata cannot be emitted. On other occasions, they bring down effluvia, raised by previous evaporation, and kept during droughts, in the upper regions of the atmosphere. This effect is now and then to be seen in our own country, and is a very common one along the African coast, and in some other sections of the world." Lind remarks, which is fully confirmed by others,

"that the first rains which fall in Guinea, are supposed to be most unhealthy, and that they have been known in forty-eight hours to render the leather of shoes quite mouldy and rotten." He further observes, "that woollen clothes wet in those rains, and afterwards hung up to dry in the sun, have sometimes become full of maggots in a few hours." The unfortunate Park says: "the rain had not commenced three minutes before many of the soldiers were affected with vomiting; others fell asleep, and seemed as if intoxicated. I felt a strong inclination to sleep during the storm, and as soon as it was over, I fell asleep on the wet ground, though I used every exertion to keep myself awake. The soldiers likewise fell asleep on their wet bundles. Twelve of them were ill the next day."

There are other exciting causes which I must here mention, especially one, the nature of which is not precisely known. I allude to the contamination of the air we breathe by an admixture of a great variety af pernicious matter in a putrescent state, particularly when this admixture proceeds from marsh effluvia, or, to use the term now generally accepted, malaria. What the precise nature of this pestiferous exhalation is, I have not attempted to investigate in any part of this work. It has been supposed to be azote, carbonic acid gas, hydrogen, carburetted hydrogen, and sulphuretted hydrogen. Professor Julia, of Lyons, examined by the eudiometer and other tests, with much care and precision, the atmosphere of the marshes in various situations, as those of Cercle near Narbonne, of the pond of Padre near Sigean, of Salces and Salanque in Ronsillon, of Capestang not far from Beziers, and those along the coast of Cette; but in these spots it manifested no cognizable change in its own constitution. Although in this respect miasmata have eluded researches, the circumstances under which they have been generated have been ascertained with precision; from which it is concluded that they are a subtile and poisonous emission, in most instances exclusively from vegetable matter in various states of decay. Hence, diseases of which they are the cause, generally prevail in such situations as are most favourable to their production, such as the vicinity of marshes and swamps, along the margins of rivers, lakes, and pools, in most alluvial

soils or other lands occasionally inundated, and especially if newly cleared with the stumps, or trunks, or branches of trees left to rot.

Ferguson, in noticing the subject,* maintains that the only indispensable condition to the production of marsh poison is paucity of water where it has recently abounded, and is incident to the last or very advanced state of the drying process; that it emanates from the saturated, half dried, and drying margin of lakes, pools, and marshes, and not from the water they contain, which must be absorbed into the soil and disappear to the eye before it can produce any mischievous effect. This opinion is deduced from a close observation of facts in different regions most favourable to the investigation. Professor Rush acknowledged however, that miasmata never generated to any extent at less than 80° of Fahrenheit. Intense heat is required, as well for the free evolution as for the modification of miasms. To disengage the exhalation, a limited degree of moisture is necessary. When, as in heavy or periodical rains in India, the water completely covers the surface of the earth, nothing baneful is permitted to escape; it is only in their subsidence that disease commences.

I have deemed it necessary to introduce these remarks, to explain the reason of the means which I recommend as preventives. The importance of the subject has excited in all enlightened countries a spirit of inquiry; it ought, therefore, to be patiently examined by my readers, in the hope that it may finally result in some useful discovery, by offering some definite ideas on the subject and laying the foundation for certain conclusions from collateral principles. For it is only by avoiding the ingenuity of hypotheses, releasing ourselves from the influence of our own prejudices, and coming at once to ocular demonstration and unquestioned facts, that we can satisfactorily arrive at sound practical conclusions. What then will tend to bring into action disease like the Epidemic Cholera? Will this volatile poison, of which we are treating, depending upon the co-existence of warmth, moisture, and decaying vegetable matter or subsoil, which prevents, according to Dr. Gregory,† the percolation of water, or some other cause of an analogous nature? A case

* Philad. Med. Journal, vol. VI.

† See Gregory's Theory and Practice.

in point is detailed by the eminent Larrey, in his observations on a violent inflammatory Fever which occurred among the cows and oxen during the campaign of Italy, affecting also the health of the inhabitants, and which dissection showed to be an intense gastro-enteritis.* The effects of malaria are seen by the living fibre shrinking from its touch, the blood seeking refuge, as it were, in the vital organs; but no external trace is left after its action, or perceived during its application, except the slight contraction of the cutaneous fibre, and a diminished activity of the capillary circulation. In all cases, the external application of the poison results in a direct gastro-enteritis Fever. If there is any cutaneous irritation, it is slight and evanescent, and it is only when the vital actions of the surface languish.† Dr. Macculloch states, that when the malaria is accompanied with a chilly night air, the certainty and violence of the resulting disease is great.‡ It is however, admitted, that the organs which suffer under the influence of the gaseous poison vary according to circumstances, which are sometimes appreciable, but often very obscure. The mucus membrane of the stomach and small intestines is always inflamed; and in various cases, the large intestines, the liver, brain, and lungs, come into the catalogue. To these are added Cholera, Dysentery, and other consequences.§ Let it not then be supposed, that malaria has no connection with the Epidemic Cholera; it unquestionably is an exciting cause, and we must be prepared to guard against it. I do not believe, however, that this invisible agent can be brought into operation without the intervention of extraordinary heavy rain and great heat, otherwise, how are we to account for the immunity from Epidemics at other than Epidemic seasons, in the variety of climates which exist in the world? In one part heat prevails, in another cold; in one dryness, in another moisture. In some parts there is difference of character from prevailing winds, relative situation, elevation, depression, or exposure, and the existence of mountains and plains; in others, from proximity to the ocean, to inland seas, and to large

* Mem. de Chir. Mil. tome 1. p. 165.

† See Daniel's Work on Fever.

‡ Macculloch on Malaria, p. 275.

§ Macculloch, p. 440.

bodies of fresh water, including the peculiar qualities of the water. In some are extensive tracts of country of unhealthy, in others of healthy character. We may instance Dum Dum in Bengal, and Cawnpore in Hindostan, by way of illustration. The one is marshy, humid, and fertile; the other dry, sandy, and sterile. The former has generally had less sickness than the latter; but both have been affected by Epidemics of greater or less virulence, according to circumstances or peculiarity of climates. Thus it will appear that vegeto-animal putrefactions are not sufficient of themselves to produce Epidemics, any farther, I believe, than they are influenced in their character and operation by sensible qualities in the air, topical exhalations, deficient ventilation, and a variety of other exciting causes. The object of these remarks, it will have been perceived, is to show the truth of those propositions I shall lay down in another place, and the grounds for the assertion, that great Thermometrical and Barometrical variations form the grand exciting cause of Epidemic Cholera, which will lead us hereafter clearly to define the means we are to adopt for its prevention.

Dr. Hardie, of the Bengal Establishment*, in a late paper to the Medical and Physical Society of Calcutta, is inclined to ascribe more to malaria as a cause than I can possibly admit. The article alluded to is on the topography of Oudypoor. He observes, that the situation in which he was placed, enjoys the unenviable distinction of exhibiting, within a narrow circle, every possible combination of circumstances which have been thought favourable to the production of malaria. Oudypoor is completely surrounded by a belt of rugged and precipitous hills, bare and barren at other seasons of the year, but covered to the top with vegetation during the rains; and the only entrances to the elevated valley on which the city stands, are by three or four narrow and difficult ghauts. Within the circumference of the valley are two lakes of considerable extent, and numerous smaller sheets of water, with jheels and marshes at every turn. During the rainy season a large portion of the surface is under water, or in the state of marsh. If therefore, heat, moisture, &c. acting on dead vegetable matter, be capable of producing malaria; or if malaria can be produced from moist mud, having vegetable matter combined with it, the poison ought to exist in

* Med. Phy. Trans. Cal. 1832.

that place in all its virulance; and Dr. H. had but too much reason to know, from personal experience, that it does exist, and that to a great extent. When Cholera makes its appearance, the mortality is fearfully great. Oudypoor has been unusually free from this scourge, however, since Mr. H. had becn at that station; though the last time it made its appearance, viz. at the termination of the season of the hot winds of 1826, the mortality in the city was from all accounts truly terriblc. Dr. Hardie proves malaria to bc an exciting cause only, the Epidemic influence being from this statement, obviously necessary to produce Cholera; else how was it that, while the cause was present, the disease had not prevailed from 1826 to the date of his communication, September, 1829?

Dr. Hardie says, that malaria is frequently attached to particular soils, and that one situation is often in a great measure exempt from its influence, while in others, similarly circumstanced to all appearance, its effects on the animal economy are severely felt. He endeavours to confirm this opinion by adducing a circumstance mentioned by Dr. Macculloch, that on the road between Brighton and Chatham, the ague affects the left hand side of the turnpike road, and does not touch the right, though the road itself forms the only line of separation. From this circumstance Dr. Hardie refers to the history of Cholera in this country, as affording instances equally singular, and states in particular that when it was raging to a fearful extent in the city of Oudypoor, there were only two casualties from this disease in the Agency Compound situated only about a quarter of a mile from thc city walls; facts which prove, says he, that here, as well as every where else, the effects of malaria are often confined within certain dcfinite bounds. From hence Dr. Hardie would have his readers believe, that malaria is alone thc grand cause of thc Epidcmic, which he endeavours to provc by the following arguments.

"Malaria, (obscrvcs Dr. Hardie,) is a vcry indefinite tcrm. We say, in general, that it is a compound gas, whose cxistcnce is only known to us from its cffccts on thc animal economy. Thcre may be many gases, howcvcr, includcd undcr thc tcrm malaria, differing from each other in thcir nature, and in thc cffccts which thcy produce. A slight diffcrcnce in thc rclativc proportions of thc

ingredients constituting different compound gases, is well known materially to alter their properties; and why not extend this principle to malaria? Besides, it has been proved that particular spots are peculiarly dangerous, and that sometimes an individual, by maintaining the erect position, will escape, while another, who lies down on these spots, will immediately feel the effects of the poison. That Cholera is produced by some such cause, all who are acquainted with its history, must, I think, allow; and the peculiarly capricious course which this disease sometimes follows, sometimes attacking those on one side of a river, sometimes those on another, sometimes raging round particular spots, while the inhabitants of these spots escape entirely, clearly indicates that the generation of the poison which causes the disease is local, and that it depends more upon a peculiar state of the soil, &c. than on the state of the atmosphere. This doctrine, first promulgated by Sydenham, has found many opponents, and it is only of late years that it has met with that support which it certainly deserves.

"Malaria, (it is however observed,) produced in any one spot, may be conveyed to a distance by winds. It will readily be granted me, that malaria, transported to any given distance from the place where it is produced, to a spot where it is not generated, will be less likely to produce effects on the animal system of so aggravated a nature as when we are exposed to the poison on the spot itself, where it is likely to exist in a much more concentrated form. In short, in the former instance we are exposed to it when it has been diluted with a much larger proportion of atmospheric air; while on the other hand it has been known to produce instant death, in situations peculiarly liable to its influence. This circumstance may, in some measure, account for the varied degrees of disease, as to mildness, &c. which it produces in different situations. If there be any instance, however, in which we would expect to find this poison in a more concentrated form than another, it would be when we find it producing Cholera; and I conceive that when we attentively consider the history of this frightful disease, we shall be disposed to admit that the poison, whatever that poison may be which causes it, is generated on or near the spot where the disease makes its appearance." Dr. Hardie then refers us to Dr. Macculloch, who has shewn, that it is the property of winds to travel in distinct

lines through a tranquil atmosphere, and often in streams of very limited breadth; that opposing streams will often move in absolute contact; and that these currents of wind preserve throughout, with the greatest consistency, the relative positions of their integral parts. This circumstance, however, will not account for the course which Cholera frequently follows. We might easily conceive a particular current of wind to be so impregnated with poisonous matter, as to affect all who come within the influence of the current. "But the history of Cholera, (says Dr. H.) is at variance with such a supposition. It is frequently seen to pass over particular spots, which are in the same line with other spots affected by it; and it is not necessary that I should more particularly point out a fact so well known as that the course of cholera is peculiarly capricious. While cholera raged at Oudypoor, winds passing over it must have constantly blown over the Agency Compound. The city stands to our south, and a little to the west, and winds from that direction are peculiarly frequent during the season when Cholera usually makes its appearance. Besides, we should *a priori* conclude, that where the poison displays itself with such force, this poison must exist in a most concentrated form; in a form, indeed, inconsistent with the idea of its being transported, which would almost necessarily infer dilution to a much greater extent than can be reconciled with the effects which it produces. The fact, that malaria may be generated on shipboard, has been fully demonstrated, (says Dr. H.) by Dr. Macculloch. Indeed, (he adds,) this fact has been long known to Naval Surgeons, and has been clearly pointed out by Dr. Dixon, Physician to the Fleet, &c. in the West Indies. This being the case, it is evident that no proof can be drawn, from the occurrence of diseases originating in malaria on shipboard, of the poison which produced these diseases being transported from the shore."

However plausible this argument may be, Dr. Hardie finds some difficulty to account why Oudypoor should have been free from the attacks of Cholera during the period before mentioned, while it was raging at the dry and high stations of Ajmere and Jeypoor, with uncommon violence. To support his argument, he is driven to say, that the excessive heat, which is the consequence of an unusually dry season, may favour the production of

this poison. Besides, in such seasons, the lakes, &c. says he, which abound in the neighbourhood (and the city of Oudypoor is skirted by one of these lakes), become very shallow, and a large portion of their moist muddy bottoms is exposed, while a marsh which occupies the centre of the city, and which is situated much below the level of the lake, is kept constantly moist by the percolation of water, both through the bund which, in one situation, confines the lake, and through the narrow ledge of rocks which skirts it in others. Indeed the greater portion of the city, which covers the base and slope of this ledge of rocks, lies below the level of the surface of the lake. Many facts too, he believes, go to prove, that malaria is soluble in water; and that during unusually dry seasons, he could easily conceive that evaporation may be carried to such an extent, as to render the waters of the lakes, &c. completely saturated with this gas, which will, in consequence, be evolved with much greater rapidity, and in much greater abundance, than when a fresh supply of rain shall have prevented the evaporation from proceeding to such a length. And as malaria does not appear to be generated from deep waters, he is of opinion that all these circumstances combined may, in some measure, account for the fact, that the inhabitants of the city of Oudypoor have always been peculiarly liable to the ravages of the cholera.

Dr. Hardie seems to be aware, however, that in the cantonment of Nusseerabad, which stands on a bleak and barren spot, and in many other portions of India similarly circumstanced, Cholera has been known to produce the most fearful ravages. Indeed it is a disease which is confined to no one locality, but appears to affect, at different times, the inhabitants of all kinds of countries. Excessive heat alone, Dr. Hardie at length judiciously acknowledges, is not capable of producing this disease; for situations escape which lie contiguous and have the same temperature. He is, therefore, brought to own that it is only by a careful examination of the circumstances in which it usually makes its appearance, by observing the peculiarities of season, soil, &c. in spots where it exists, that we can arrive at more satisfactory conclusion on this interesting subject.

In speaking of the attachment of malaria to particular soils or spots, Dr. Hardie says, that he only alluded to the capricious course which Cholera has been known to follow, in proof of the fact that the same observation which has been made in other countries, also holds good in this. We can trace, however, he observes, this same attachment when we find malaria producing other diseases. In the city of Oudypoor, there are particular spots which have always been found to be remarkably unhealthy; and in many of our cantonments there are particular bungalows and compounds, which our servants strongly recommend us not to occupy. These warnings ought not to be altogether disregarded, though we do not participate in the superstitious terrors of the natives, who never fail to attribute the unhealthiness of such spots to supernatural agency; since the most extensive experience has proved that particular spots are peculiarly unhealthy, though frequently we cannot assign any cause why they should be so. For reports of this kind there must be some foundation; and Dr. Hardie says, he has himself had reason bitterly to regret that on one occasion he did not pay a little more attention to a report of this nature.

With regard to the season of the year, during which (under ordinary circumstances) malaria is most abundantly produced, this gentleman is of opinion, that the months of August, September, October, and November, are those in which we are most liable to be affected by it. The period of the hot winds, (except in seasons when Cholera rages,) is, says he, perhaps the healthiest periods of the year. In general, very few cases appear on the sick list; and, as far as his information extends, this remark holds good throughout the whole of India. He accounts for the circumstance by observing, that though the weather is exceedingly hot, the winds are dry; vegetation being completely at a stand, and the whole face of nature parched and dried up. He admits, therefore, that it has been proved, that a moist atmosphere is a better conductor of malaria than a dry one; he does not deny that malaria is also conveyed through a clear atmosphere, but during the season of the hot winds, he says, the production of this poison is limited, on the principle, that there is no increase of vegetation to supply material for its generation, and most of the

marshes, &c. are completely dried up. These circumstances, combined with the extreme dryness of the air, a dryness unknown in colder climates, will sufficiently account, in Dr. H.'s opinion, for the fact above stated. Even after the rain has continued to fall for some time, the climate of Oudypoor continues healthy, the weather becomes cold and agreeable, and though occasional cases of a slight ague indicate the approach of a more unhealthy period, these are slight, and easily yield to proper remedies. During this period vegetation has made rapid progress; the hills which were before bare and barren, are now green to the top: living vegetables, however, do not appear to produce malaria, and therefore the effects of this poison are not felt to any great extent till towards the end of the rainy season.

I agree with Dr. Hardie, in opinion, that when the soil has become completely saturated with moisture, and when the rain still continues to fall in abundance, we have not much cause to dread the effects of malaria. The month of July is certainly one of the most pleasant and most healthy months of the year. The same may be said of the beginning of August. Towards the latter end of that month, however, Intermittent Fever becomes common, and the cases of this disease become more numerous as the season advances, while the latter end of October, and towards the beginning and middle of November, is the most unhealthy period of the whole year.

One important and well ascertained fact is, that Epidemical diseases take the course of large rivers. The fact is certain; but whether this is caused from the water evaporated by the heat of the day, and condensed by nocturnal cold, thus leaving great moisture on the surface of the earth, and in the atmosphere, I am not prepared to say. The Epidemic Cholera, for instance, was remarkable for attaching itself to the course of rivers, whilst mountainous countries almost always escaped, which it would be supposed was owing to an absence of these vapours.

The disease originated, according to the Reports to the Medical Board, in Sonergong and in the Dacca district, in 1817; it likewise appeared along the banks of the Megna, to Naraingong and Dacca, attaching itself chiefly to ferries and market place; it then prevailed on the banks of the Burrampooter, affecting the villages

situated on both its margins, from the mouth of the Hooghly, to its formation in the Ganges near Moorshedabad, where the same peculiarity was observable. The Shipping at the New Anchorage, at Diamond Harbour, and along the whole channel, as high as Hooghly, were particularly affected. In the Bhaugulpore district, this propensity was so strong, that the disease scarcely appeared in the interior, whilst it almost depopulated the low lands near the Ganges. Mozufferpore, and the villages along the Gunduk river in Tirhoot, and the station of Chuprah, on a branch of the Ganges in Sarun, were alone visited; while at a subsequent period, the disease prevailed along the Gogra, at numerous cities in the N. E. quarter of our territories, from Allahabad upwards, along the channel of the branches there forming a junction. The disease however did not prevail under the hills. It wavered so little from the line of those rivers, that hardly a town or village lying remote from their course, was brought within its influence. The same rule held yet more unexceptionably in Rajpootana, through the province of Bundlekhund, and all along the Nerbudda, to the numerous branches of the Chumbul. These are important facts, and well accord with my reasoning on the effects produced by a humid atmosphere. In the centre division, again, more individuals were taken ill during the night, than in the day; and more, previously to moving from their ground in the morning, when the troops were constrained to stand long in the cold heavy dew; and the successions of seizures was so quick, that it was more than once necessary to relieve the sentries three times during the two hours, which it is customary for them to stand guard. This was especially the case with the Artillery, of which scarcely a man on guard during the night escaped; and of the whole number seized, two-thirds were taken ill between sunset and sunrise. Here too, the different degrees of susceptibility amongst different descriptions of persons were very remarkable. The bearer and khulassee generally, and with the Artillery, the drivers and men of the Magazine establishment, were attacked in much larger proportions, than the regular soldiers; because they were inferior in strength to the sepoys and goolundaz, had no tents, received less pay, and were worse clad and fed.

In Agra, and other cities of Upper India, where it is the custom of the natives of all classes to sleep on the tops of their flat-roofed houses, during the great heats of summer, the effect of exposure to the cold and dew was particularly exemplified; for the greater number seized, were persons so situated, and few escaped of such as having heated themselves during the day, lay out during the night with little or no covering. On the other hand, almost all the gentlemen's servants, who took to wearing woollens, on the change of weather, continued in good health. A like circumstance was also remarked in the centre division, but there it was confined to the establishments of one or two officers. Lastly, long fasting, by disordering the functions of the stomach, and paving the way to indigestion, was a frequent precursor and cause of the disorder. Thus in the city of Delhi, where the Epidemic happened to prevail during the great annual feast of the Ramzan, in which it is unlawful for Mahometans to eat while the sun is above the horizon, a much larger proportion of persons of that persuasion suffered than of the Hindoos, who were not similarly restricted as to the times of their meals.

It was observed, that individuals daily performing a moderate portion of work, especially if under shelter, were far more exempt than those who were alternately idle and fatigued by heavy labour. Thus the persons employed in the silk filatures in different parts of Bengal, who are engaged from morning to evening in tasks of a light nature, suffered very little; whilst coolies, and all classes casually bearing burdens, or going long journeys, were frequent victims. The reason might be, that the bodies of the former were kept in good condition, by the stated quantity of labour; whilst the latter were at one time exhausted by over-exertion, and at another lay indolently asleep on the cold, damp ground.

Mr. Jameson, alluding to exciting causes, remarks, "that were we to look for an epitome of all that composes the exciting causes of Cholera, we need only refer to the appearances presented in the Chittagong district, during the hot season of every succeeding year. This district is formed by a narrow belt of land, extending about two hundred miles from North to South, bounded by the sea to the west, and by lofty ranges of mountains to the East and North East. The surface of this tract

is irregular, and interpersed with low hills, and rising ground, covered with brushwood, bamboos, and forest trees. The intervening flats are highly cultivated; and rice being the chief produce, are quite dry during the hot season. The soil is light and sandy, and there are no swamps or marshes throughout the district. From the month of March, as the sun ascends, strong southerly winds begin to prevail. The atmosphere then becomes moist and cloudy, with great heats and occasional falls of rain; the nights calm and sultry, during the early part, and cool with a chilly air from the east towards morning. The effect of these great diurnal vicissitudes upon the human body, is very striking. The moist wind from the sea, and the stagnating air of the evening, produce profuse sweats, relaxation, and great nervous irritability; and thus render the frame, especially during sleep, extremely sensible to external impressions, and fit it for the reception of disease. In this state, it is acted upon by the cold wind and dew of the morning; a strong check is immediately given to the previously violent perspirations; the blood is driven towards the centre, and that disturbance of the circulation, which we know to be one of the early attendants on Cholera, is thereby superinduced. This disease is accordingly endemical in the district during the hot weather of each year; and does not subside until the air is cooled, and the atmospherical temperature becomes more even, after the setting in of the regular rains.

"We shall find causes of the same description, that is, great and sudden vicissitudes of the weather from cold to heat and from moist to dry, accompanied with changes in the direction of the winds, were almost uniformly in operation, wherever the late Epidemic shewed itself; and were generally the immediate precursors of its visits. It has been already seen, that in Calcutta, and other divisions of Bengal, its first rise was preceded by a long course of unusually humid and sultry weather; and that its subsequent periods of increase and decline were always modified by changes in the weather. Thus in Feb. 1818, and April 1819, the two most marked periods of its aggravation, the days were sultry, and the nights cold and raw, with heavy storms from the south and east. So it was in almost every part of the Lower Provinces: in Jessore, Burrisaul, Dacca, Sylhet, Chittagong, Nuddea, Rajashahy,

Bhaugulpore, and Monghyr; as well as in the valley of Khatmandoo, and in many other stations. At Patna, the weather had been very hot and dry sometime before its appearance. At Buxar, no rain had fallen for nearly a month; the days were exceedingly oppressive, and the nights chilly, with heavy dews. At Allahabad, although no great changes occurred in the range of the Thermometer, during the night and day, the mercury generally fluctuated between 84 and 91°; and the air was very sultry to the feel. At Cawnpore again, the Thermometer ranged from 72 to 112° during the whole of April and May, when the disease prevailed in the town; and in Lord Hastings' camp in Goruckpore, the mercury in tents stood at 80° at sunrise, and at 110° at noon. At Futtihgur, the weather had been insufferably hot, and not a drop of rain had fallen for a month; when a heavy north-wester occurred on the afternoon of the 9th of June, and next morning the Epidemic was first seen. So in Agra, the morning and day of the 1st of July were exceedingly hot: the Thermometer stood at 96° in the shade; and not a breath of air stirred. At 6 P. M. a gale of wind from the east suddenly came on; the air at once grew damp and chilly, and next morning many persons were carried off by the Epidemic, and during the whole period of its continuance the days were very hot, and the nights cold and moist with a keen penetrating wind; the Thermometer ranging from 84 to 94°. But as the wind came round to the west and the weather became steady, the disease withdrew. At Meerut, the weather was perfectly seasonable, with frequent heavy falls of rain during the three first weeks of July; but from the 24th until the 29th, when the disease broke out, there was not a single shower; the Thermometer then fell four degrees below the monthly average, and the nights became sensibly cooler, with heavy dews. Jeypore became affected immediately after the cessation of heavy rains; and Saugor, and all the towns and posts in its vicinity, during the hot winds, when the days were warm, and the nights so cold, that quilts and blankets were used."

Referring to the Reports compiled by Mr. Jameson, we find that the Epidemic appeared in the centre division in the beginning of November. Of October, the first eight days had been cloudy, with easterly wind and occasional falls of rain; the Thermo-

meter ranging from 79 to 90°. From the 8th to the end of the month, with little variation, the wind was strong from the west, and hot, with clear sky, and sultry weather; the mercury towards the latter part, falling as low as 62° at sun-rise, and keeping as high as 98 and 99° at noon, and from 84 to 96° at sun-set. The same extraordinary fluctuations in the range of the Thermometer were remarked during the early and middle parts of November; the mercury from the 1st to the 17th standing from 50 to 60° at 6 A. M., from 84 to 99° at noon, and from 63 to 90° at 6 P. M. the wind still keeping westerly. About the 5th, the effects of the sudden transitions began to be more marked than before; the days became insupportably oppressive, and the nights extremely chilly, with heavy dews, and fogs in the mornings. From the 6th to the 12th, the period within which it is agreed by all that the camp was first affected by the Epidemic, the Thermometer was never higher than 51° at sunrise, nor lower than 84° at noon. On the 6th, it was 50° and 90°; and on the 7th, 45° and 90°. These, it will be remembered, were the days during which the earliest cases, in all probability, occurred. About the middle of the month, the difference of temperature between the day and night became less; and the disease sensibly declined from the 17th, and wholly withdrew towards the latter part, as the variations grew more equable, and the weather became such as is usual during that period of the year; the dews and fogs here stood in the stead of rain, abstracting the heat of the body by primary application and the subsequent evaporation.

There were great vicissitudes of temperature with the left division during the early and middle parts of April, with daily storms of thunder and rain; the days were extremely hot; the mornings and evenings foggy; and the nights so cold, that blankets were required; the Thermometer ranging from 45 to 78° at day-break, and from 86 to 103° at noon.

When the disorder broke out in the Rajpootana force, a different state of weather prevailed. From the 1st to the 14th September, there was only one day's intermisson of rain; and the atmosphere was exceedingly cold and damp. There was continual small rain during the whole of the 13th, the day preceding that on which the disease broke out; and the air was very raw and chilly. On the 21st the rains began to cease, and with them the Epidemic.

Two other instances deserve mention, in which the pernicious effects of cold and moisture were especially remarkable. From the 9th to the 15th August, the 2nd Batt. 19th Regt. B. N. I. then encamped on low ground, under damaged tents, in very rainy weather, at Mundessore, was severely visited by the disorder; of thirteen Sepoys taken ill, six died. After a few days, the Battalion moved to a higher spot; and although one man was taken ill during the march, not a case occurred after it reached its new ground. So, with the 1st Battalion 6th Regiment, in Malwa: this corps, with a large body of camp-followers, on the 4th of May, encamped on the high banks of a dry river bed, at Jhanoor, three marches south of Ougein; the day was excessively hot; at 5 P. M. heavy rain came on, and the Thermometer, from being at 100°, fell suddenly to 80°. The disease, which was not then in the neighbourhood, attacked the detachment next morning.

In appears then, from the foregoing examples, that the principal exciting causes of the disease may be enumerated in the following order, according to their degrees of priority, and frequency of operation;—1st. alternations of heat and cold, combined with rain, or a very humid state of the atmosphere; 2nd. simple alternations of cold and heat.

When the disease first appeared at Vizagapatam, Mr. Scot observes, that the weather is said to have been oppressively hot, and the air loaded with humidity. So it re-appeared at Rajmundy, in January 1819, when it was uncommonly cold, but with a south-east wind, which is always humid. So at Masulipatam the disease for some time appeared only in one bomb-proof apartment. This was low, damp, ill ventilated, and very crowded; but although these disadvantages were in some measure remedied, it continued to produce a greater number of cases than the other two at Jaulnah. Mr. Scot remarks, the atmosphere was generally cloudy, and the wind blew steadily from the south-west. This kind of weather continued during the prevalence of the disease, also when it appeared at Hoobly, Badamee, and Durwan. Mr. S. remarks, that a strong wind prevailed from the W. with clouds and heavy rain. The troops, likewise, says the same gentleman, in 1819, in the neighbourhood of Guddie, experienced a severe attack, at the commencement of

which a strong easterly wind prevailed; when it changed to the west the disease declined. So at Bellary, it is said, during the bleak westerly wind the disease was only partial. The brahmins, who inhabited a close and damp street, suffered in great proportion; while the banians or merchants in the town of Guntoor, who occupied the only dry and wide street in it, almost entirely escaped. The disease, it is said, spread over the whole of the *zillah* of Nellore, which extends about 180 miles from north to south, and varies between 40 and 60 miles from East to West, except the two south-west divisions of it, which altogether escaped the visitation; these being the most elevated parts of the zillah, populous, and much frequented by merchants, the disease was much more fatal than in any other parts in the whole western frontier, which is near the hills; and in some of the villages there situated, it did not at this time appear.

When the disease first appeared at Madras, on the 5th of October, the wind was south-easterly, the weather cloudy and wet, and the poorer classes suffered more from its ravages, than those in better circumstances; when the wind changed on the 24th, the disease stopped. When it began to prevail at Nagore, it occurred principally among the caste of natives whose occupations obliged them to expose themselves much to the weather, which was then damp and rainy. When the Epidemic appeared at Arcot, it was on the day on which the wind changed from the south-west to the north-east; the wind blew in sudden squalls, torrents of rain fell, and the sky was generally overcast; and although the Thermometer did not fall lower than 74° at noon, a peculiar chilly sensation was felt. On the changing of the wind, the disease considerably abated. When it showed itself at Sankerydroog, on the 19th of November, it appears that the weather had been for ten days preceding, cold, cloudy, and rainy. It is likewise mentioned, that of the prisoners in the Jail, who were exempted from the usual labour and exposure during the prevalence of the disease, only 19 were attacked, and only 2 died.

The inhabitants of the large hills enjoyed an exemption from the visitation. At the time H. M. 69th Regiment were attacked, on their march from Bangalore to Cannanore, the vicissitudes of the weather, it appears, were sudden, and the camp was nightly,

deluged with rain. When the disease ravaged Manantody, in Wynnaad, the weather was cloudy, and strong, cold, easterly wind prevailed. It is also reported, that at a town near the beach adjacent to Tillechery, the disease was ushered in by the land-wind blowing with great force, the atmosphere being cloudy; for a few days some rain had fallen, and the night air was chilly, so that the natives complained of the cold. At Cannanore, it is said, the poorer classes of the people, especially the beggars and fishermen of the town, and the aged, infirm, and destitute, were the greatest sufferers. At Calicut too, the poorer people, who suffered great privations, were chiefly victims to the disease. It is stated, that the disease appeared among the multitude of people assembled at Tutocoreen, for the usual pearl fishery: upwards of 10,000 were collected on the occasion, most of them exceedingly poor and badly fed, miserably accommodated in temporary huts, and exposed to great heat during the day, and to heavy dews at night. While the 7th Regiment was marching to Hydrabad, the weather was very rainy and boisterous, and the ground of encampment generally damp, when 60 cases of Cholera occurred, of which 18 terminated fatally; but when the men ceased to move off the ground, until the sun was fairly up, they were exempt from fresh attacks. The 1st Battalion of the 22nd Regiment marched to Masulipatam, when the weather was extremely rainy and the ground wet; Cholera appeared shortly after they marched. When it attacked the 2nd Battalion 20th, during their march to Hydrabad, with such violence that 73 men died; the weather is stated to have been cool and cloudy, raining slightly every day. So likewise when the 1st of the 1st Regiment marched to Hydrabad, it appears they lost 64 men, little rain fell, but the nights and mornings were cold, and there were heavy dews. H. M. 46th Regiment, on their route to Cuddapah, continued healthy, until they experienced a violent storm, when six men were seized with Cholera: the 8th Regiment continued exempt from the disease, on its march to Nagpore, until they encamped on low sandy ground near a tank. Thus 47 men of the 2nd Battalion, 1st Regiment, died of Cholera, on their march to Trichinopoly; there had been a thunder storm accompanied with great gusts of wind from the north-east, and a shower of rain; on both those days the number

of attacks was greater than it had been for a considerable time preceding. The disease appeared in the 2nd Battalion 15th Regiment, on their march to Hydrabad; having lost 79 men, when the day were very hot and the nights cold and damp; but as soon as the corps was comfortably accommodated, they recovered rapidly.

Some circumstances have already been incidentally mentioned, tending to show that an east or south-east wind, with damp dews, cloudy weather, and great heat, attended this Epidemic. A more particular view of the influence of an easterly wind in producing or increasing that disorder, will now be necessary. The unhealthy and unpleasant character of the east wind has been remarked in this country, especially during the season of the hot winds. From the various accounts of the rise of the Cholera in different parts, it appears that the east wind was blowing at the time, in a great majority of instances. This was almost without exception the case in Bengal, throughout which the Epidemic arose in the rainy season, when the wind blows almost invariably from the south-east. It was observed at Calcutta and Nuddea to decline in virulence on the setting in of the northerly wind, and to recommence its ravages with the recurrence of the south-east wind. The same prevalence of easterly and southerly winds attended its progress through Tirhoot, Sarun, Behar, and Shahabad. The disease, there is ground for believing, began to rage in the camp of the centre division of the Army, immediately on the west wind giving place to the east, which also seems to have been the prevailing wind for some time before its appearance at Buxar, Ghazeepore, and Mozufferpore, in Jeypore, Agra, and other parts of Central India.

The few exceptions to these statements, which occur, are not sufficient to prevent us from drawing a general conclusion, that the appearance of the Epidemic in any particular place was usually accompanied or preceded by an easterly wind; and that there is a connection between the prevalence of that wind and the production of a pestilential atmosphere. This deduction is confirmed by what we read in Scripture History of the east wind as the harbinger of drought, and heat, and pestilence. Thus Ephraim is threatened with desolation by means of this wind: "Though he be fruitful among his brethern, an east wind shall come, the wind of the Lord shall come up from the wilderness, and his spring shall become dry,

and his fountain shall be dried up." (Hos. xiii. 15.) The east wind is also spoken of as inducing a pestilential atmosphere, (Deut. xxviii. 22,) by means of the putridity which ensues during its prevalence; a fact so well established, that butchers and farmers will not kill while it continues to blow.

Desirable as it would be to ascertain what it is that occasions that powerful influence in the east wind, which has caused so much calamity to mankind, whether owing to its peculiar constitution, or to its being a better conductor of malaria, according to Dr. Macculloch, the subject is so clouded and intricate, that, despairing to accomplish the discovery, we must be content to reconcile ourselves with the conclusion, that the influence is inexplicable. Though we must acknowledge our ignorance of the origin of the pestilential atmosphere, which has desolated all India, it may nevertheless be useful to look into the effects of the awful changes which have taken place in the elements, by earthquakes, hurricanes, and storms, during the period of the existence of these Epidemics.

Were we to enter into an investigation of the wonderful phenomena of disturbing causes, wherever they were manifest, we should require, as data on which to ground our conclusions, the temperature of the atmosphere, and some knowledge of what is called the magnetism of the globe; a knowledge of the effect on the temperature in different parts which is produced by winds, the form of lands, the vicinity of the sea, the nature, the radiating and evaporating power of soils, the direction and altitude of mountains, which produce or retard the streams of wind: by means of these we should obtain a pretty perfect knowledge of those phenomena which apply to local exciting causes; but we require much more to obtain an approximation to the nature of a general influence or cause. Nothing yet has been attempted to enable us to advance to such a view. True, indeed, much speculation was abroad, that the separation and dissolving of the fields of ice; which formed circumpolar continents, influenced the state of the climate of the whole globe, indicated by meteorological appearances and magnetical phenomena as connected with electricity It was inferred, from the vast floating bodies of ice seen by several vessels in the Atlantic, that the dislocation in the Arctic seas had been very general; and that the floating and the thawing of these vast bodies of

ice in the low latitudes, had been the cause of the extraordinary gales of wind, storms, and inundations, which visited the whole of Europe in 1818; and it was believed that so long as these fields and islands of ice continued to be carried away from the Polar Sea, there would be a continuance of these extraordinary changes.

That the solving of these icebergs may have changed the influence of the wind, and thus concurred with other causes in producing Epidemics over the whole world, may be concluded with some degree of probability. To establish the fact, we may observe, that one great and awful change in the elements has convulsed nearly the whole earth, not sparing the most temperate and tranquil portions of the globe. We may refer to the recent shock of an earthquake in the vicinity of Athens, where the town of Vostassa was said to be inundated, and 5,000 persons drowned. The beautiful island of Sicily met with an equally lamentable and affecting visitation, from the effect of unprecedented earthquakes; while, in the chief towns and in the country adjacent, a destruction of property, estimated at upwards of five and half millions of money sterling, was caused thereby. The town of Palermo, the villages of Bronti, Castaglione, Rocella, Valdiente, and Millazo, are recorded as having shared in the general destruction.

It is communicated also, that in the mildest season of the year, which is the spring, at mount Etna, the whole of that part of the country experienced at the same period a most alarming shock from the same cause. Catania, however, sustained the greatest damage; for it is asserted that the most solid edifices trembled, that the cathedral and part of the seminary fell to the ground, in which places the whole of the inhabitants perished. The churches of Aca Catania met with similar injury; a whole monastery was thrown down, and buried a great number of nuns in its ruins. At Zaffarrana, while the inhabitants were at their devotions, the vaulted roof of the church fell in and crushed the minister and fifty individuals. The village of Mustaccia has ceased to exist, and the vineyards and gardens have been completely destroyed. The sea in many places broke over its shores, and destroyed all in the way of a deluge.

It is added, that the Appenines shook by the effect of this general convulsion of the earth; destroying sixty thousand lives, and exciting a general depression and alarm never before experienced in this lovely spot of classic history.

It is further represented, that in the winter an immense avalanche fell from the mountain of Rusbeck, and covered an extent of three wersts in length, to the height of 50 fathoms; it completely dammed up the river of Trech, which did not until the third day find a passage underneath a mass of snow.

A hurricane at Barbadoes, and among some of the neighbouring islands, is described to have taken place in the same year, so terrible in its visitation, that a similar instance is not on record, since the one which occurred there in 1780. The gale commenced on the 15th of September, attended with torrents of rain; the evening closed with the most terrific appearance, as if giving notice of the dreadful havoc which was to ensue; the wind and the rain increased, and the deluge of water became almost irresistible, rushing over plains with the most impetuous fury: the appearance of the town became distressing beyond description, the water had risen in the streets three or four feet, and in many places, as high as five feet, and nothing was observed but families seeking protection and security in other quarters; men were seen wading up to their middles, protecting their wives and children, the servants conveying what property they were able to carry, but scarcely knowing whither to turn with it. Buildings were blown down, and plantations destroyed. In a division of the Parish of Saint Andrew, called Scotland, there was scarcely a small house left standing, several buildings sunk under the earth. At Sprieghts town, the same awful phenomena took place, and the Irish town completely joined with the sea. Similar damage took place among the shipping.

In America, in 1818, the drought which pervaded Charleston and the neighbouring States was so great, that grain and crops of all description were destroyed, the largest reservoirs in the low country were entirely exhausted; and it was with the greatest difficulty sufficient water was procured for the most extensive plantations. In one of the upper sections of the state of Georgia, not a drop of rain had fallen from the heavens for thirty-nine days; and the dews were so light as to afford no relief to the dejected

hopes of the planter. Three dreadful earthquakes took place at Columbia, South America, on the 4th, 5th, and 11th of April: by these awful visitations more than 3,000 people were traversing the neighbouring places, flying from the desolation which threatened them.

It is stated to be a similar cause, which gave rise to the extensive and alarming fires in Leyden, which happened within all the provinces, four or five leagues of Stockholm, and laid waste districts of two German miles in circumference: the cutting down of trees most exposed to the fire did not check the progress of a conflagration occasioned solely from a prevailing drought. It is strange however that in the valley of Scheld, the rain had poured down in such torrents, that the whole of the harvest was lost, and considerable anxiety prevailed among the inhabitants, who dreaded that from the excessive heats which prevailed, added to the putrefactive and stagnant waters, some alarming pestilence was commencing to add to their distresses. Intelligence from Strasburg represented, that that city resembled an island, in consequence of the great floods which inundated its environs. The Bruche, as well as an arm of the Rhine, was overflowed, and burst one of the dikes intended to keep it within a regular course: part of the glacis was laid under water, and great alarm prevailed throughout the country. The elevation of the water was increased by the impetuosity of the wind, which augmented the movement of the waves to such a degree that the fields and the roads were one sheet of water. Trade was materially injured from every communication being shut up; and the large fairs held there at this season, from time immemorial, were in consequence prevented.

At Kehl the greatest apprehensions were created, and the utmost exertions were required from the inhabitants of all the surrounding communes, in order to prevent the bursting of the only dike which preserved the place from the inundations of the Rhine; for had the waters of that river joined with those of the Renzig, the overflowing of which had produced considerable injuries, it would have caused the inevitable destruction of a part of the city. About the same period, it is mentioned, that every effort was made throughout Holland to relieve the unhappy sufferers by the late calamitous inundations.

In March, 1820, the most dreadful hurricane took place in the British channel, such as the oldest seamen did not recollect to have occurred before. Along the line of the French coast, for a distance of forty miles, the shores were strewed with floating wreck. In April, an earthquake was felt at Middleton, and in the neighbourhood of the harbours north of Cork. At Liverpool, in October, the ravages of a severe gale was almost without example; it was also experienced along the Yorkshire coast, and that of north Devon; some vessels were totally lost off the coasts of Norfolk. The Scotch coasts shared equal disasters. It is mentioned that at Portsea, the pier, which had stood above one hundred years, was carried away; and the mass of wreck from various quarters in the north exhibited a disastrous picture of the effects of this gale. The frost at Port Glasgow was unprecedented for many years back; and after a sudden thaw, an uncommonly violent earthquake was felt, people were jostled one against another, and quite stupified by the concussions, while the clashing of doors and ringing of bells terrified those who had not time to quit their habitations. The same troublous changes occurred in France early in July, when a violent storm occurred. After several claps of thunder, a copious shower fell, and in a few minutes after, a terrible hail storm which caused extensive injury: three-fourths of the hail that had fallen were of the size and form of a calibre ball, rather flat; the remainder had the same form but were in size equal to five franc pieces, and as thick as five or six of these pieces; some were still larger, and one which was tried was found to weigh three ounces. The plains of Limours, Gomety, and Lallay, suffered considerable damage. At Lisle, the fields to an extent of seven leagues were entirely destroyed, either by hail, wind, or water; the roads were covered with trees, beat about by the hail. The storm also burst over Paris, and was most violent. A thunderbolt fell on the Palace du Carousel, also at Rue des Provinces, and another on the gate of the Lauvere, on the Crane. On the 27th a dreadful storm took place at Chasselay, three leagues from Lyons.

To many of the foregoing details much more could be added, shewing the terrible effects produced from the disturbed state of the elements, throughout Europe, during the years 1818, 1819, and 1820. At the risk of being deemed tedious in enlarging on this

statement, I shall proceed to shew the prevalence of unexampled Epidemics, simultaneously in all parts of the earth, at this present awful and alarming crisis. Revolutionary events following on the strides of wide spreading epidemic influence in Poland and Russia, justifies the conjecture hazarded by a modern philosopher that there exists an intimate connection between the political vicissitudes of the human race and the extraordinary occurrences in the physical world so frequently coincident with them.

An Epidemic Fever prevailed of various types, but each of equally destructive and virulent character, in all parts of Ireland; and the hue and cry of contagion was once more set forth. Dr. Barker of Dublin observes, "that a considerable increase of the sufferers from Fever took place, and with little fluctuation, continued progressively up to the year 1815, at which time admissions to the Hospital became much more numerous than at any former period. It was now evident to those who were most disposed to confide in the efficacy of the preventive measures hitherto adopted, that in whatsoever degree these might have been beneficial, the causes of Fever were still predominant. As the number of beds in the Hospital had become insufficient for the reception of all applicants, and the increase of Fever might proceed from this cause, the managers of the Institution, with the aid of a parliamentary grant, erected a new building; and it might have been supposed with reason, that the Hospital thus enlarged, together with the extensive wards of the house of industry, would have afforded sufficient accommodation for all such patients, and have served, at least, to restrain the further progress of disease. But events were soon to prove unhappily that such means were inadequate to produce this effect; and that ordinary preventives of the most approved efficacy were insufficient. Hospital accommodation, increased to an extent almost unprecedented, might equal, or even exceed the demand, and yet Fever continued to extend its ravages; and efforts directed by intelligence and information, aided by wealth and power, in whatsoever degree they might retard, were altogether incapable of stopping the progress of this formidable calamity. The Epidemic Fever which had prevailed in most parts of Ireland, for more than a year past, at length reached the city of Dublin; the Fever had made steady

advances, and patients now enter the Hospital at the rate of at least two thousand monthly.

"During the two last years, particularly in the year 1816, the crops had failed, owing to the unusual cold and moisture of the atmosphere. The spring of that year was remarkably late; rain fell on a majority of the days, during the months of July, August, Sept. and Oct.; the heavens were generally so obscured with clouds, that the influence of the sun's rays upon the soil must have been much less than usual; and the mean temperature of the months of spring, summer, and autumn, was 3½ degrees below that of the similar preceding period. From a registry of the weather, kept by the Reporter, it appears that the medium temperature of Dublin, within the period, commencing with February, and ending with October, 1815, was 54° 32′; and during the same time in 1816, it was only 50° 90′; the difference amounting to 3° 42′. In adjoining countries the difference of these seasons was equally remarkable. In the vicinity of London, the medium temperature of the mentioned months, in 1815, was 53° 9′; and in 1816, only 49° 9′; the difference amounting to 4°. The depth of the rain which fell during the same time at this place, in 1815, amounted to 15.16 inches; and in 1816 to 23.87 inches. We are informed, that in France the mean temperature of the nine first months of the year 1816, was two degrees less than that of the same period of 1815; and during the months of July and August, 1816, there fell about three times, and in September about twice, as much rain as in the corresponding months of 1815. This unfavourable state of the atmosphere prevailed in many parts of Europe, and probably exerted its influence over a great part of the northern hemisphere.

"The following year also, though in a less degree than 1816, was cold, moist, and unfavourable to the harvest. It deserves notice, that the increase in the number of Fever patients in the hospitals of Dublin, Cork, Waterford, and Edinburgh, was nearly simultaneous, and took place at the latter part of autumn. As to the condition of life of those attacked, it may be truly said that the Fever pervaded all ranks of society; and it is questionable whether at certain periods, particularly the commencement, it did not prevail equally among the rich; and with reference to the relative num-

bers of those classes in society, this will not appear improbable. During the prevalence of great Epidemics, the complete extinction of most other diseases has been noticed by many writers. This to a certain degree was observable on the present occasion. A few cases of small-pox came under the Reporter's notice, during the early months of spring; but this or any other diseases did not become frequent, the Epidemic Fever appearing as it were to supersede all other acute diseases. On the effects of such a Fever prevailing epidemically, it is almost needless to dwell. The loss arising to society, from the interruption given to productive labour; the expense incurred by providing for the sick; the debility and weakness of constitution induced by the disease; the mortality which must attend it, and is most frequent where it is most injurious, namely, among men advanced in life, who are often the heads and support of families; the increase of poverty and mendicity, together with the agonizing mental distress to which it must give rise, are consequences of this Epidemic that must occur to every humane and reflecting mind.

"Among the concurrent causes of this Epidemic, I would place first, the miserable condition of the lower classes at this period. In the privations arising from the failure of the crops over the greater part of Europe, Ireland largely participated; at the same time, great numbers of the poor, who in this country are too generally destitute of the advantages to be derived from industry, were thrown out of all employment; the consequences were want, and many of the evils which follow in her train. That a connection exists between famine and pestilential diseases, is universally acknowledged, and that Epidemic Fever is an attendant on scarcity, will be allowed by those who will take the trouble of inquiring into the History of such Epidemics.

"Among the concurrent causes of this Fever, the failure of fuel, in consequence of the preceding wet seasons, also deserves notice. Turf or peat is the chief fuel of the labouring classes in the country parts of Ireland, and in those wet years it was remarkably scarce and bad; hence must have arisen the crowding of apartments in order to obtain warmth, and diminished ventilation, since a fire in the fuel must constantly renew the air; and with these consequences of the want of fuel must have been combined an

creased difficulty of cleansing either wearing apparel or dwellings. So great was the scarcity of fuel, that in some parts of the country, 20 miles distant from Dublin, coals were cheaper than turf, though the price of the former was considerably enhanced by land carriage for several miles; and some benevolent gentlemen in the country, drew the coals from the nearest sea-port, to supply the pressing wants of the poor, which the failure of fuel had occasioned.

"Of late years Petechial Fever has been remarkably prevalent in many parts of Europe and in North America. Great numbers of the French Army perished from it in their return from the invasion of Russia. Authentic documents shew that Fever prevailed epidemically to a great degree in Leipsic, in the year 1813, where it was said to have been introduced from East Russia, and to have followed the course of the French Armies. It prevailed about the same time at Dresden, and at the fortress of Torgon, when besieged by the Prussians, immediately after 10,000 men and 5,000 horses had been thrown into it, with all the sick of Dresden and the neighbouring country; the disease assuming great malignancy, and carrying off at least one-third of those attacked, with many of the French physicians and surgeons. From Saxony the disease appeared westward. In October it first appeared at Hanau, and on the banks of the Rhine; in December, in the south of Germany, at Wirtemburg, first in the north and then in the south. At Altona it prevailed in the beginning of 1814, when 17,000 fugitives, from Hamburg and other parts of the neighbourhood, crowded into the most miserable habitations, and were there exposed to the greatest suffering and privations. Thus it spread by degrees, from Prussia and that quarter of Germany which the wretched fugitives from the invasion of Russia had first entered, over the greater part of Germany.

"From a report of Baron Larry, sent in to the French Government, December 10th, 1813, it appears to have prevailed among the inhabitants and army at the following places: Pont a Mousson, Nancy, Thiancourt, Saint Benoit, Manthul, Verdun, Etain, and Malatour.—(See his memoirs, vol. iv. p. 459.)

"It reached Paris in the month of February 1814, and many of the attendants on the patients in hospitals were affected during the subsequent months, particularly in May. About the same

period, it is well known to have been exceedingly prevalent and fatal in our armies in Spain. From the returns published by Sir James MacGregor, in his excellent Sketch of the Diseases of the Army in Spain, it appears, that of continued Fever there were admitted to the Regimental Hospitals,

		Patients.
In	1812	19,923.
,,	1813	11,294.
,,	1814 to June 24,	5,007,

and of these numbers about one-tenth died.

"At Ciudad Rodrigo, one-fifth of the inhabitants died of misery and Fever in 1812. Political events have prevented the attention to this subject at present so desirable. Dazzled with the splendours of war, we have overlooked its miseries; hence probably it arises, that histories of the progress of Fever, have either not been published, or the accounts have not reached us. An interval less productive of Fever than usual, appears between the years 1815 and 1817, although we have no reason, from experience, to suppose that fever had abated on the continent, for this is not its usual course. But in the spring of 1817, it prevailed in many parts of Europe. Thus it was present at Turin in the spring of that year, and to a considerable degree, although the physician, from whom we have the account written at the time when the Fever prevailed, seems unwilling to allow any alarming prevalence of Fever, yet he admits it to be Petechial,and states, that from 18 to 20 persons died of it daily in a population of about 89,000. The wish of this writer to prove the non-existence of any contagious Fever in Savoy, to which also his inquiries extend, arises, as he states, from the apprehension lest the French Government should interrupt communication and prevent commerce. Fever was also extremely prevalent at Rome. From an account which I have before me from a friend who visited that city in the spring of 1817, it appears, that within a few days before the end of Easter, Fever had increased to such a degree that it became necessary to open new wards for the reception of Fever patients. The mortality was great; many of the attendants, including priests, being carried off. It extended among the upper orders, and some of the physicians of the town fell victims to it.

The number of deaths was so great that the physicians became greatly alarmed, and the attention ofthe government was attracted. In this case also scarcity of food had contributed to further its progress. The crops of the preceding year had failed, and the unfortunate inhabitants were so reduced by famine, that the most disgusting articles of food were eagerly sought after to satisfy the cravings of hunger. At Venice also, Fever was observed to prevail in a great degree, and was attributed by Dr. Arietti, principal physician in that city, to prisoners brought into the north of Italy; but it was evident that the malady had existed there for some years previously, though not in the same degree. The preceding facts prove sufficiently that Fever, simultaneously with war, and diffused principally by unknown agency, aided by famine, spread over a great part of the continent, which was the same evil that extended to Britain and had reached Glasgow and Edinburgh.

SECTION V.

PREDISPOSING CAUSES.

Mr. Jameson in giving a detail of predisposing causes, commences by stating that exposure to the heat of the sun, which was in all cases observed to be a powerful exciting cause, would, when long continued, or renewed during many successive days, become a predisposing cause, by inducing fatigue or debility. So in many other instances, the two classes were mutually convertible.

Of the causes strictly predisposing, debility in whatever way induced, was by far the most powerful, and most generally present. To its operation, we are chiefly to ascribe the fact so universally observed, that the lower classes, those badly fed, and ill-clothed and lodged, suffered more than persons in better circumstances of life. This was particularly remarkable in the different divisions of the army visited by the disease. Thus in all of them, the Hindoo, who lives chiefly on poor, crude, and acescent vegetables, and is in all respects both of diet and clothing sparing of expense, was more liable to be attacked, than the Mussulman, who eats flesh-meat, sometimes uses spirituous liquors, and is generally warmly dressed, and comfortably lodged. For like reasons, the European soldier was less subject than either class of the native troops; and the European officer, again, less so than the soldier. How much this depended on the possession of greater bodily strength and power of resisting disease, was demonstrated in the case of the European Flank Battalion, the men of which had been previously debilitated by attacks of the Epidemic Fever at Allahabad, during the foregoing year. This Battalion suffered, accordingly, more than any other with the centre division. Of 800 officers and men, it had at one time 200 in Hospital; and it buried its surgeon and 54 men. In like manner, convalescents whose constitutions had been weakened by previous disease, suffered proportionably more than persons of sound frame: many were taken ill whilst under the influence of

mercury, used for the cure of Fever, Hepatitis, and Lues. Thus too, persons of sober, regular habits, enjoyed greater immunity, than the drunken and dissipated, who kept irregular hours, and were frequently exposed to the vapours and cold of the night after a debauch.

The second great predisposing cause was fatigue, accompanied with, and aggravated by exposure to the sun by day and cold by night. Thus in Calcutta, it is remarked, that the men working in the open dock-yards were far more frequently taken ill, than persons of nearly the same descriptions employed under shelter in the cotton screws. In respect of diet and mode of life, the advantage was undoubtedly in favour of the former, who are generally mechanics on high wages, whilst the latter are common coolies, or day labourers of the poorest order. For the same reason, fishermen, boatmen, husbandmen, gardeners, travellers, bearers, washermen, and prisoners, working on the roads, suffered dreadfully.

The ill effects of fatigue were particularly striking in the case of the left division of the army. All classes of this division, for many days previously to the breaking out of the Epidemic, had undergone great exertion, in the sun by day, and in the cold of the night, whilst conducting a heavy train, through a difficult country, to Mundela; and accordingly suffered severely. The 2nd Battalion 28th Regiment, which lost more men than any other corps, had been left in the rear to conduct the store carriages, and had necessarily gone through greater fatigue and exposure than the main body.

All accounts agree in stating, that the young, the healthy, and the robust, are the least liable to Cholera. The observation of a great proportion of our medical officers being confined to their practice in military hospitals, we have not sufficient data to determine, whether there be any peculiar liability to Cholera in one sex more than in another; but if the preceding remark be well founded, it might be inferred, that the greater delicacy of females, and perhaps their greater tendency to nervous disorders, would give rise to a greater predisposition to it in them, than in males. Children are subject to Cholera, but it has been observed particularly in Mr. England's Reports, that infants, who have

been confined exclusively to the breast, are not susceptible of the disease. This remark, however, is to be received with reserve, as the paucity of that class of subjects in comparison with any other must obviously diminish the facility of forming a just conclusion.

It has also been very generally remarked, that people, who have been debilitated by recent disease, or by the remedies exhibited for its cure, and even while actually labouring under acute disease, are very susceptible of Cholera. Patients under the full influence of mercury have been frequently seized with it; so have pregnant women. One attack of the disease, far from conferring immunity from a succeeding attack, seems rather to give a predisposition to it.

Many instances are noticed, where Cholera has supervened on the use of neutral purgative salts. The effect of these medicines bears ,indeed a strong resemblance to some of the appearances in Cholera. The clear, watery, debilitating stools ; the chill in feverish subjects, and the ague fits which they cause, obviously point them out as unsafe, especially during the prevalence of this disease. Cases of Cholera, terminating in death, have occurred after drinking unwholesome liquors. An instance of this happened in a party of six men, who, after drinking together, were all seized with it, in consequence of which several of them died. Three men having eaten, at the same time, the seeds of the coral plant, had all the symptoms of severe Cholera. Large draughts of cold water have been often observed to occasion relapses, and are even said to have brought on the disease.

SECTION VI.

MORTALITY

CAUSED BY

THE CHOLERA.

The data in Mr. Jameson's possession, were not sufficiently numerous or accurate to enable him to form a correct statement, or even a plausible conjecture of the number of persons, who have perished by the Epidemic. Several circumstances have concurred to diminish the value, and to circumscribe the extent of the facts amassed on this point. The vast tracts of country, over which the disease raged, and the scanty and scattered state of the European settlers, who alone are capable of collecting the requisite information, would, under every circumstance, have rendered it impossible, that complete returns should be obtained. Many places distant from the large stations, and of limited population, would probably escape observation, and of those introduced into the returns, the loss would be either exaggerated, or lowered, according to the laziness, caprice, or interested motives of the native reporters. The inconveniences apprehended from entrusting the inquiry to the native Police officers, were indeed, so great, that, upon application being made in the proper quarter, it was thought right to discourage the attempt. The grounds upon which this determination was taken, were, that the power necessary to be given to the Thannadars, and other persons of the same class, in order to enable them to form the desired census, could not be delegated without their immediately making a handle of it to oppress the natives under their jurisdiction; and that the results of the inquiry, as dictated by carelessness, interest, or fancy, would run far wide of the truth. Besides, that the native population have always shewn a rooted aversion to having their

numbers reckoned, from a painful recollection, that under their former rulers, expedients of this sort were never resorted to, without leading to the imposition of capitation taxes, and other heavy burdens.

Notwithstanding these obstacles, lists of the total number of deaths, purporting to have been carefully made out by the Police officers, under directions of the magistrates, have been obtained from several districts. But even these come in a very questionable shape. They appear to have been mostly taken at a late period of the disorder; when the mortality occurring during the early part of its progress, could only have been guessed from indistinct recollection. Another suspicious circumstance is, that the deaths are generally stated in round numbers of thousands, and tens of thousands, partly for the sake of producing greater effect, and partly from an indistinctness and propensity to exaggeration, common to the natives of India, with all other Asiatic nations; from which it may be suspected, that the aggregate was not made up from a number of subordinate lists, but roundly put down at random. Another source of inaccuracy is, that when the Epidemic was at its height, it was the fashion to lay every death to its account; so that every person, who was cut off suddenly, or in an unusual manner, was said to have died of Cholera.

Mr. Jameson having premised these observations, proceeds, to lay his materials before the reader. To commence with Calcutta. The only accounts he had been able to obtain of persons taken ill, in the city and suburbs, are those containing the lists of individuals attended by the native physicians at that time appointed by Government all over the country, to administer medicines to the sick. Even these are imperfect. For in the city, they embrace a period of three months and eleven days only, whereas in the suburbs, they extend from the 19th of Sept. 1817, to the 25th of July of the following year; when the establishments were finally discharged, being deemed no longer necessary. It appears, that from the 19th Sept. to the 31st Dec., of 13,920 persons, who in Calcutta applied for aid, 9,595 were discharged cured; 3,395 remained on the convalescent list; and 930, or rather more than one in ten, died. In the suburbs again, comprehending a circuit

of five or six miles diameter round the boundary ditch of the city, of 21,876, to whom relief was afforded between Sept. and Aug. 20,870 were saved ; 1,378 died, or nearly a 16th ; and 259 remained convalescent at the end of the period. Amongst these, the mortality was greater at one time than another ; being from Sept. to Feb. as one in 14 ; and from Feb. to Aug. as one in 13. Of those affected, the proportion of males to females was reckoned as four to one, probably from difference of exposure ; that of children, and infants at the breast, a mere fraction. It must not be imagined, that these lists afford any thing like a fair index of the general mortality at the Presidency. Both there, and in other quarters of the country, thousands were prevented from applying for aid, from the rapidity of the attack, from distance, from aversion to European medicines, and from a superstitious desire to await the termination of the disorder in the vicinity of some sacred spot. The mortality was undoubtedly very great; but it would be vain to hazard a conjecture of its amount, of every second or third family, large and small, perhaps one, two, or three, and in some cases, five or six members perished. For many months, numerous parties were constantly met carrying the biers of the dead, and the banks of the river were crowded with Hindoos, burning the bodies of departed relatives.

In Jessore, 10,000 persons were said to have been cut off in two months, after the first appearance of the disease ; and as it has ever since been fatally prevalent in that district, a vast addition must since have been made to the number. In Backergunge, of those who were attacked in the earlier months, scarcely any recovered without medicine ; and the mortality was accordingly great. The proportion of deaths was, however, less considerable, where medical aid was duly applied. In Mymensing, where the disease has raged for two years, the deaths, according to the police lists, amounted to 10,714 ; according to the belief of the medical officers, to much more. In 1817, they occurred chiefly among the lower classes ; in 1818, neither caste, age, nor sex was spared ; and in September, October, and November, the mortality was frightful. At Bulloah, and in the whole of the south-west division of Tipperah, few survived, without medicine, and it is estimated, that a tenth part of the whole population disappeared.

In the Dacca district, we have some precise statements to go upon. From August, 1817, to January, 1819, of 6354 persons reported to have been attacked in the district, 3,757, or more than one-half, perished. In the city again, where assistance was promptly given, of 1,081 taken ill before the end of the first year, 72 only died, and of 1,124 in the succeeding year, only 101, or scarcely one in ten. The houses in the town and suburbs amount to 20,000, and as in many, five or six individuals were affected, it is estimated, that we should be near the truth, if we were to allot one case to each dwelling. The disease was most destructive in the commencement. Males were liable in a double proportion to women; and with them, the attack was more certainly fatal.

In the district of Sylhet, the deaths according to the Thanadars' reports came within a few of 10,000. The return of the Sudder Thana, (Sylhet Town,) in which the houses were numbered, for facilitating the assessment of the Chowkeedaree tax, and the deaths more accurately ascertained, might be better depended upon than the rest, and was to the following purport: Houses, 3,316; deaths, from Aug. 1817, to January 1819, 1,197. Supposing this to be correct, and allowing six persons to each house, there would be a population of 18,896, from which the mortality would be as one to seventeen. Throughout the district, the average of those attacked, is assumed as one in eight; and of deaths as one in twenty-nine. The mortality was great in the autumn of 1818. Amongst the servants of European residents at the chief station, of 298 individuals, 50 were seized, and 5 died; and all these were better off as to diet, lodging, and medical aid, than the bulk of the people. In the Sylhet corps, of 450, of all ranks, 29 cases, and two casualties occurred; and of 230 prisoners in the jail, 42 seizures and 13 casualties. From a register of individuals in the town, who received aid, of 300 cases occurring in April, May, and June, 1818, only 25 died; whereas of 430 cases, in like circumstances, in the three last months of the year, 84 sunk.

In the district of Nuddea, out of a population reckoned at 13,00,000, the disease between June, 1817, and July of the following year, attacked 25,400 persons; of whom died 16,500, or more than two-thirds. At first the mortality amounted to one-

half. Of 4,789 persons to whom medicine was administered, 1,066 died; or rather more than one-fifth. In the neighbourhood of Baulea, without medicine, the proportion of deaths was three-fourths; with it only one-fourth. In the town of Nattore, from Sept. to June, 540 persons died, of a population between 45 and 50,000; or little more than one in a hundred. In the district, the deaths were as one to four of those affected. Numbers of women, and boys, and girls, were attacked; but no child under eight years of age.

The disease was dreadfully destructive in Burdwan. Departing from its ordinary course, it was here mildest in the commencement; the mortality during the rains of 1817, and subsequent cold weather, being only about one in four, rising in the hot winds to four-fifth, and again decreasing in the rains to one-tenth. It is singular too, that during the period of greatest mortality, the persons mostly affected were the Sepoys and well fed inhabitants of the town, whilst the convicts and debtors in the Civil Jail remained healthy till the rains, when they alone were attacked. According to the Thanadars' registers, 15,571 persons perished in the Bhaugulpore district, between Aug. 1817, and May, 1818. In the beginning, all castes and classes were alike subject to its attacks; and from Aug. to the end of 1817, of those seized, it is affirmed, that not one in a hundred survived.

In Tirhoot it appeared, from the doubtful reports of the Police establishment, that between 9 and 10,000 persons were carried off. Here it is said to have indiscriminately attacked individuals of all classes, and of every age and sex. In the city of Patna, the total mortality was not ascertained. In the end of 1817, the disease was more general; in the following hot winds more rapidly destructive. From the 25th of April to the 10th of July, 1,539 deaths took place amongst a population of 250,000; and of 30 Sepoys attacked during that period, 15 died in spite of medicine. More males were affected than females. In Chupra, the casualties were said to have exceeded 700. The mortality throughout the province of Behar, including Shahabad, and the northern parts of Ramgur, was very great.

At Chunar, the casualties did not exceed one-tenth; at Benares one-eighth, of such as took medicine. In the latter, females were

seized equally with males. So, at Allahabad, persons of either sex and of every age were affected; and the total mortality in the district is stated at between 8 and 10,000. From this city upwards, as the disease was milder, and less general in its attacks, the casualties were comparatively fewer. Thus, in Cawnpore, of 80,000 inhabitants, 500 only were seized; of whom no more than 50 died. In the adjoining contonments, the mortality amounted to one-fifth of the diseased. In Shahjehanpore 500 died. No returns have been received from any part of Goruckpore or Oude, if we except the 2nd Battalion 15th Native Infantry, which, during the time it was stationed at Lucknow, had 35 cases and 11 deaths, from a strength of 1,000 men. In Futtihgur, the list of deaths was very small. In Coel, of 300 sick, 70 died. In Agra, the deaths did not exceed 10 daily, although the town contained 30,000 people. Not 500 in all died in Muttra, and about a like number, in the immense city of Delhi. In Meerut town, which has 35,000 inhabitants, only 400 were seized, of whom 60 or about one-seventh died; giving a proportion of deaths to the whole population of one in 120. Of 600 persons living in the great bazar, 200 were affected, and 50, or one-fourth died; of these 29 were men, 15 women, 3 young persons, and 3 children. In an adjoining village, the inhabitants of which could not be persuaded to use any remedies, every individual attacked died. In the whole district, of which only a few principal towns, as Shamlee, Dalun, &c. were visited, 1,399 deaths occurred. Of the casualties, it is strange, that 1,000, more than two-thirds, occurred in Deoghat, a small town, containing only 7,000 inhabitants, in the Begum Sumroo's territories. The fact is given on the authority of a European gentleman, who satisfied himself of its accuracy by minute inquiry; but no mention of local peculiarities accompanies it. In Saharunpore, no more than 250 perished of a population of 30,000. The mortality in the whole of the Jeypore principality is said not to have surpassed 1,200. In Kotah, 100 men are stated to have died daily; but we have no precise account of its ravages in Ougein, Indore, Nagpore, or any other of the great Mahratta towns. In Hutta, and other places in the vicinity of Saugor, the mortality was undoubtedly great; and in the district adjoining Banda, the deaths

were reckoned at 10,000. In the town itself, the disease attacked all descriptions, indiscriminately, from two to sixty years of age; but as medicine was sedulously administered to the sick, only 67 died, of 2,170 individuals known to have been seized.

Let us next examine the amount of the loss sustained in the different corps of the army. In the centre division, the mortality was on conjecture, variously calculated at five, eight, and twelve thousand. The truth is, that in all cases, it is next to impossible, to compute correctly the exact amount of the vast variety of persons, constituting the class of camp-followers with an Indian army; and amid the confusion and desertion occurring in the centre division, during the sickly period, the real extent of its loss could hardly have been ascertained. The mortality was undoubtedly greatest from the 14th to the 19th of November; and it was calculated that at the very least five thousand of all classes perished during these five days. The armed force consisted of 3,500 Europeans, and 8,000 natives. Of the former 230, and of the latter 534 died. The average loss of each Battalion was computed at 50 men; but this is mere conjecture, as no accurate returns were obtained. In some corps the number attacked was very great. Thus the 1st Battalion 8th N. I. had 350 seizures, and 40 deaths; and the 3d Regiment Cavalry, 154, and 18 deaths. In the 2nd Battalion 1st Regiment N. I. 48 Sepoys and 25 followers died, between the 10th and 26th. From the 2nd Battalion 11th Regiment N. I. 268 cases were admitted, of whom 43 died. In the Rocket Troop, 27 Europeans were attacked, of whom one only died; and 87 natives, of whom 18 died. Of 2,000, of all classes, attached to the King's 67th Regiment of Foot, 90 died. The mortality, amongst a given number seized, varied, according to the difference in the period, and in the class of the individuals attacked. From the 10th to the 15th, it did not exceed one in eight; and was then chiefly confined to the bearers and other description of camp-followers; from the 15th to the 19th, it increased to 1 in $3\frac{1}{2}$, and then occurred principally amongst the Europeans and Sepoys; and from the 22nd to the 30th it decreased greatly. We have said, that the disease was at its height on the 18th. Of the 2nd Battalion 11th N. I. 56 Sepoys were admitted on that day; from 20 to 30 on each succeeding day, to the 22d; and

from thence to the end of the month, only 20 in all. Of the European artillery the average of deaths was one-fourth; of Golundaz, rather more than a fifth; of gun-lascars less than a fifth; of drivers a third; and of magazine men, a half. Of the natives, the two former classes are chiefly Mussulmen, the two latter Hindoos. The great mortality amongst Europeans may be ascribed to their constitutions having been previously debilitated by irregular modes of living and uncongenial climate; to the comparative severity of the attack, and greater struggle in a plethoric habit and muscular frame. Women were equally with men obnoxious to the disease, and died in a like proportion. Thus of 268 females attacked, 43 or one-sixth died. It was observed, that concubines and prostitutes suffered in a larger proportion than other descriptions of women; probably from their dissipated habits, and precarious mode of life.

The mortality in the Hansi Force was very inconsiderable. Not more than 271 persons in all were seized, of whom 51 or one in five and a half perished. Of these a large proportion was Sepoys, of whom 126 were attacked, and 27 or rather more than a fifth died. The majority of deaths occurred in the early part of the disease, when it was more virulent than afterwards, six Europeans only were attacked, of whom one died.

In the Rajpootana force, which in fighting men and followers amounted perhaps to 15,000, the mortality was greater. The armed part of the force consisted of 96 Europeans (officers not included) and 4,100 natives, of whom 292 were admitted; and 122, nearly one-half died. The different corps were variously affected. Of the European Artillery, only three were seized, all of whom recovered. Of the Golundaz, 240 in number, 6 sickened, and 2 died; of 250 Gun Lascars, 21, of whom 12 died; of 392 Ordnance drivers, 44, of whom 17 died; of 294 Pioneers, 53, of whom 23 died; of the 2nd Cavalry, 600 strong, 8, of whom 2 died; of the 2nd Local Cavalry, 720 strong, 4, of whom 2 died; of 5 companies 1st Battalion 27th Regiment, 18, of whom 7 died; of the 1st Battalion 28th Regiment, 944 strong, 135, of whom 57 died; and, of the 2nd Battalion 19th Regiment, 887 strong, 3, of whom none died. Of 75 camp-followers, who took medicine, 15 died. Here Europeans were slightly affected,

and the lower elasses suffered most. This was not uniformly the ease; for aeeording to one statement, the Sepoys suffered more than the eamp-followers in the 1st Battalion 28th Regiment. By this aeeount, the strength of the Battalion is stated at 1,004, of whom fell ill 144, and died 60; whilst of 513 eamp-followers, 35 only were seized, and 14 died: the easualties among the Sepoys being in double proportion to those of the followers. The Battalion eonsisted of 878 Hindoos and 126 Mussulmen. Of the former, three-fifths were Brahmins and Rajpoots, the remainder of low eastes; 57 Brahmins were taken ill, and 30 died; Rajpoots 47, and 16 died; low eastes, 21, and 9 died; or of the whole affeeted, a little more than one-half. Of the Mahometans, 19 were seized, and 5, or one-fourth died. So that the disease was more fatal to Brahmins than to Rajpoots; to Rajpoots than to the lower eastes; and to Mussulmen the least so of all. It was most destruetive from the 14th to the 22nd September; of 108 admitted from this Battalion in the first week of its visit, 51 died; after whieh the average was about one-fourth.

In the left division, of 8,500 fighting men, 125 eases occurred, of whom 49, more than a third died; 30 in April, 18 in May, and 1 in June. Here the disease equally attaeked Hindoos and Mussulmen of all orders; drivers, lasears, bearers, grooms, and grass-eutters, not being more liable than the regular troops. Children were peculiarly exempt; females not. The mortality was greatest from the 10th to 21st April.

In the Nagpore Force, from the 31st May to the 15th June, of about 4,000 regular troops, 13 Europeans were seized, of whom 6 died; and 211 Sepoys, of whom 29, or one-seventh died. The mortality was greatest, perhaps two-thirds, at first. The eamp-followers were affeeted very severely; grooms more so than any others. The artillery lascars, drivers, and water-earriers, were most exempt. Women were affeeted equally with men; and children at the breast were not safe from its attaeks.

From the whole of the foregoing statements, we think it may perhaps be inferred: 1st, that the sum total of the mortality oeeasioned by the Epidemie, fell far short of the rate assigned to it, by the voiee of the publie, during the seasonof alarm; 2nd, that the mortality was proportionately much greater, among large and

dense, than among small and dispersed bodies of men; 3rd, that in a given place, it was generally greater in the commencement, and middle, than towards the termination of the disorder; 4th, that when unlimited by the intervention of remedial means, it generally amounted to one-half, and sometimes to two-thirds of the seizures; 5th, that, where medical aid was duly exhibited, it rarely amounted to one-third, and was generally as low as one-fifth of the attacked; 6th, that men were generally more susceptible than women; and that infants and children were nearly exempt.

The foregoing observations, from the pen of Mr. Jameson, on the mortality occasioned by the Cholera, in the provinces under the Bengal presidency, leave nothing to be desired on the subject. It is to be regretted, however, that we have not sufficient materials in the Reports from Madras and Bombay, to enable us to form an adequate view of the extent to which the Epidemic has carried its ravages in the other parts of India.

In the Madras Report, our attention is confined to the ravages of the Cholera in the army; no attempt being made to ascertain the extent of mortality among the other inhabitants of the Peninsula. The returns embrace a period of five years, commencing from 1818, about the middle of which year the disease began to prevail extensively. In that year, there were 1,087 admissions from the European forces, which exceeded 10,000, and 232 casualties, being in the proportion of 21 per cent.; and 3314 admissions from a body of 58,000 native troops, out of which there were 664 casualties, which is 1 per cent. less than the proportion among the Europeans. The following year, the disease appears not to have raged so violently among the Europeans; for only 564 were attacked, out of which 85 cases terminated fatally; although it prevailed in nearly an equal degree among the natives, 734 deaths occurring out of 3,779 admissions, in the proportion of 19 per cent. whereas among the European troops, it was only 15 per cent. The number of troops, both European and native, affected by the disease in 1820 and 1821, is smaller, while the proportion of deaths is greater, than in the preceding year. Without entering further into the details, we shall exhibit a general view of the mortality during the whole period under review. The total number of cases of Cholera, from 1818 to 1822 inclusive, is 3,664 among Europeans,

of which 695 terminated fatally, and 15,830 among natives, of which 3,735 ended in death. The proportion of the casualties to the admissions is about 19½ per cent. in Europeans, and something more than 23½ per cent. in natives.

Mr. Scot's remarks on the formidable nature of this scourge are very appropriate. "Great as the proportionate mortality which has just been stated, may appear to be, it is nevertheless probably far within the truth. When the disease first appeared, there were many causes tending to magnify the number of attacks and the number of cures, and a most erroneous estimate was too generally formed of the relation in which these events actually stood to each other. The regimental practitioner was accordingly astonished and dismayed at finding when the disease attacked his corps, and each case was authenticated under his own observation, that the proportion of deaths was most widely different, and greatly exceeded his calculations."

We have still less information in the Report from Bombay respecting the extent of mortality caused by this Epidemic in the territories dependant on that Presidency. It appears that within the Island of Bombay, medicines were distributed in August, 1818, to 4,400 persons, out of which number 256 died; and in the following month, to 4,804 persons, 287 of whom fell victims to the disease. The police reports mention 409 persons as having died in August, and 478 in September, without medical assistance. From October to February of the following year, 5,447 cases are said to have been ascertained, and 395 deaths; while the police reports for the same period exhibit 407 casualties. The whole amount of ascertained cases, where medicines were administered, thus amount to 14,651, of which 938 terminated fatally, showing the proportion of deaths to be 6.4 per cent. The number of deaths ascertained by the police is 1294; but as this number is formed from Reports of only a particular part of the island, it falls much below the truth, requiring probably an addition of one-third to render it nearer correctness.

From these partial statements, some conjecture may be formed of the mortality occasioned by this Epidemic throughout India. It will be impossible for me, without more certain data, to indicate the precise extent of its devastations wherever it has made its

appearance; but from the numbers which perished under its attacks, in spite of the efforts of medical skill and experience, and the general alarm which its ravages produced in the minds of all classes of persons, an estimate may be made, however unsatisfactory, of its destructive powers in the numerous places which are destitute of the benefits of medical aid.

SECTION VII.

SOME PECULIARITIES

OF

THE CHOLERA.

The general appearances and habits of the Epidemic will be so fully described in the body of this work, that little will be required in this place. Before, however, proceeding to treat of the symptoms and curative means, a few remarks, derived from Mr. Jameson's Report, may be here introduced, in illustration of one or two characteristic features, of the disorder. Whilst the contagious nature of the disease was under discussion, it was stated, that those lying sick in hospital of other ailments, were not attacked by it, in larger proportion than persons in health; with the single exception of convalescents, whose greater liability seemed solely attributable to their enfeebled condition. We might hence conclude, that unlike the plague, small-pox, and others of the Exanthemata, which, when Epidemic, have been observed to suspend the influence of other maladies, and as it were, for a time to convert all other kinds of disease into their own specific mode of action; the Cholera has no power of transmitting, and turning to itself other forms of illness. In further proof of this assumption, it may be stated, that no where did the disorder, when prevailing Epidemically, seem decidedly to take the ascendant, so as, for the time, either wholly to banish or sensibly diminish, other species of morbific action, common to the seasons and place. It is no doubt true, that throughout the whole of the year of its rise, Fevers and bowel-complaints were in Calcutta milder than usual; but it is not known, that the cases were fewer in number, or that when the morbific action of Fever or Dysentery had once fairly begun in an individual, it was even disposed to run into that of Cholera. It is likewise true, that in the camps of the centre and Hansi divisions, it was

by some believed, that the common Endemics of the climate were less frequent, during the period in which the Epidemic was among them; but then, this was perhaps attributable to the milder forms of disease attracting little notice, whilst the attention of all classes was strongly arrested by the ravages of a new and formidable malady. Besides, this persuasion was by no means general; at least one half of the Staff concurring in the opinion, that it did not exert any influence whatever on other complaints.

Moreover, the probability of the supposition was much lessened, if not quite destroyed, by what happened in other quarters. Thus, in the Nagpore force, Bilious Remittents were more than commonly prevalent during the existence of the Epidemic; and the season was particularly sickly all over the province of Berar. So, in Jubbulpore, the usual diseases went on at their wonted pace; and throughout Saugor Province, the Small-pox raged at the same time with Cholera. A like circumstance occurred in Cawnpore, in which the small-pox was extremely fatal in April and May, 1818, when the city was visited by the Epidemic, and in Calcutta, in the spring of 1819, at the very time in which Cholera was in one of its periods of greatest aggravation. In like manner, autumnal Intermittents were common in the Rajpootana force, during August and September, and in the cities of Jeypore and Delhi, Fevers of the remittent and intermittent type, Diarrhœas and Dysenteries, continued very prevalent, until the end of the cold weather.

Many other instances to the same effect might be found in the Upper Provinces; but to save needless accumulation, Mr. Jameson, the compiler of this statement, adverts to those situations in the lower parts of the country in which the disease long existed in full force; and must necessarily have displayed this peculiarity, if it had constituted any part of its essence. In Chupra, Fevers and other Endemics were less common; in Tirhoot, just as usual. Neither in Bhaugulpore, nor at Monghyr, did it exert any influence. At Malda, and at Nattore, other diseases were less frequent. In Burdwan, Bowel Complaints were fewer; Fevers not so. In Nuddea, Remittent Fevers, Liver and Bowel Complaints were more than usually frequent amongst Europeans; the natives were more

healthy. At Dacca, Fevers were, during the first year, less frequent; in the second, more general and obstinate. In Sylhet, Intermittent and Remittent Fevers, running into and alternating with Dysentery, were more than usually common; and it was remarked, that so far from their shewing any disposition to coalesce with Cholera, an attack of the one disease generally protected the person attacked from the influence of the other; so that he who had Fever, would not afterwards have Cholera, and vice versa. In Tipperah, Intermittents, and in Backergunge, Bowel Complaints, were more general than in former years. In Mymensing, Bulloo-ah, and Chittagong, there was no perceptible difference.

From a comparison of the foregoing facts, Mr. J. deems, it is clearly deducible, that the Epidemic did not exert any influence in lessening the frequency, or in modifying the symptoms of Fevers and other disorders common to India; and that in every case, in which an apparent exception to the general truth of the proposition occurred, it probably arose from a cause purely accidental.

The next observation made by Mr. Jameson is, that an individual having once undergone the disease, thereby became much less subject to be again attacked, than a person who had not passed through the same previous seasoning. It is not by this meant to be asserted, that relapses did not sometimes occur, in persons who had not perfectly recovered from the effects of the first attack, nor even to deny, that, in some rare instances, the disease recurred at long distant intervals, when the individual had entirely regained his strength, and was to all appearace in perfect health. All that Mr. Jameson intends to affirm is, that such cases were exceedingly uncommon. To many of the medical officers, who possessed large opportunities of observation, it did not occur to remark a single instance. Thus the centre division of the army hardly affords half a dozen of instances; not one of which happened to the medical officers left in charge of the whole body of the sick, from the beginning of December until February following. Previously to the retrogade movement of the centre division from Erich upon Gwalior, early in December, the European and native sick were removed to Sumpter, an elevated healthy town, on an open plain, in which a field hospital had been established. The sick amounted to about 200 Europeans and

1,000 natives. They soon got over the Dysenteries and Diarrhœas, which formed the sequelæ of the disease, and not a case of relapse, or secondry attack came to notice.

In the left division and Rajpootana force, according to the unanimous declaration of the medical staff, no case of re-seizure occurred, after the strength had been fully restored. In the Nagpore force, two or three instances came to notice, but all came under the strict denomination of relapses; for although the individuals had recovered from the primary shock, a sufficient interval had not been allowed for the complete restoration of their strength. The most decided case was that of a European, who having been twice attacked, whilst under the influence of mercury, had so far recovered, as to return to his duty; when, after a lapse of five or six days, he got the disease a third time and died; with the Kurnaul division, not a single case offered. The same immunity from secondary visitation was observed in every quarter in which the Epidemic prevailed; and Mr. Jameson says, that he should perhaps not be far wide of the truth, were he to affirm, that of the many myriads attacked, the returns of the whole country do not afford a score of well authenticated cases of a recurrence of the disease, after the removal of debility, and every other consequence of the primary attack.

Another curious circumstance in the economy of the disease was, that not only were persons who had once undergone its attack free from its further assaults; but even individuals, and bodies of men, who having come within its pestilential influence, had escaped unaffected, were nevertheless much less obnoxious to its future visits, than those who had not before been exposed to it. In other words, a village, which was visited by the Epidemic during the first year of its prevalence, would, on the disease re-appearing in that part of the country be much less likely to suffer, than another village, which had not before been affected; and an individual going from the former, into the air of the latter, would have a better chance of immunity, than its inhabitants, who had not undergone the previous seasoning. This was the case, to a greater or less degree, in every part of the provinces; in which it was generally remarked, that the Epidemic, on its recurrence, either did not at all re-visit the places formerly

affected, or only in a much lighter manner than those to which it was yet a stranger. In Tirhoot, particularly, in which the Epidemic twice appeared, at two distant periods, the truth of this observation was strikingly illustrated; since, according to the information of a very intelligent observer, not a single instance occurred of the disease re-visiting the same place, throughout the whole extent of the district.

But it is in the different divisions of the army, the bodies composing which long remain under the eye of the same medical officers, observes Mr. Jameson, that we should expect to find the existence of this law most clearly established. It is here, accordingly, that we have the best examples of its reality, Thus in the Jubbulpore force, the 7th Regiment of Cavalry, and 2nd Battalion 13th Native Infantry, which corps had suffered severely in November, with the centre division, and at the brigade of boats, remained quite exempt. Thus too the 2nd Battalion 19th, which was violently affected by the disease in August, had only three slight cases in September, when the other corps of the Rajpootana force were so roughly visited. But the best illustrations are to be found in the centre division. When this force broke up after the termination of the campaign, His Majesty's 24th Regiment of Dragoons, and 87th Regiment of Foot, and the 1st Battalion 8th Regiment N. I. marched to Cawnpore, where they were stationed in April and May, when the city and cantonment were suffering from the disease. At this time, the 24th Dragoons remained quite free; His Majesty's 87th had two slight cases among the recruits, who had not been with the centre division, and no death; and the 1st Battalion 8th Regiment N. I. had, according to one statement, no case, according to another, one only, and according to a third, three or four, all slight attacks. The situation of the latter corps was such as to give additional proof of the immunity of bodies of men, previously exposed, not being accidental. For it so happened, that this Battalion was placed right between the 2nd Battalion 15th Regiment N. I. and Craigie's Levies; both of which suffered severely, as not having earned the same means of protection. Camp-followers of all descriptions were equally exempt; and one person only, a European officer, who had been with the centre division,

fell a victim to the disorder. In like manner, the 2nd Battalion 25th Regiment N. I. which again fell in with the disease in April, whilst marching from the Teraii for Lucknow by Goruckpore, then suffered comparatively little. It had indeed 25 cases and 5 deaths ; but of these only one was a case of relapse or recurrence, and even in it the symptoms of both attacks were very mild. But a still more extraordinary instance occurred in Lord Hastings' camp, during the march to Goruckpore, towards the latter part of the same month. The disease here first broke out among the followers of a gentleman, who had just joined the party, and in a few days attacked between 50 and 60, out of 400, chiefly of the class of bearers. It next appeared among the servants of several gentlemen in the Civil Service, then in attendance upon the Governor General ; and to the period of its decline, was confined to such persons as had not been with the centre division. This could not be explained on any difference of situation ; for the party daily changed ground, and the new comers were mixed promiscuously with those who had been previously exposed to the Epidemic influence. Nay, it further appears, that after attacking the first party, the disease shewed itself amongst other persons, not yet seasoned, in the opposite end of the line ; leaving all between untouched. If any other proofs were necessary, says Mr. Jameson, he might cite the case of the 2nd Battalion 3rd Regiment, the greater part of which, having had the disease at Shergurh, were not at all affected, although stationed at Banda, when the town suffered severely. But enough has been already said to shew that the human frame, on being exposed for some time to the Epidemic, got habituated to it, and in a great measure became insusceptible of its influence.

There is reason to believe, that the lower animals were in some measure affected by the corrupt state of the air at the period. For, it was observed in many places, that an unusual mortality occurred amongst black cattle, sheep, dogs, and other domestic animals. Thus in the Backergunge district, cattle had the disorder, and were cured by opium and the other remedies found most serviceable in the human species. Cows, when seized, shed their young. So in Tipperah, great numbers of horned cattle and sheep were seized with vomiting and convulsions, and suddenly

expired. In 1815 again, half the cattle of the lower part of Tipperah were carried off by a disease similar to Cholera. In Delhi, dogs died rapidly; and more horses than usual were carried off by the dry gripes. In the Rajpootana force, and throughout the whole of the Jeypore ond Nagpore territories, the season was remarkably fatal to camels; and in the centre division, domestic animals of all descriptions died in great numbers; but in the latter instance, the mortality might be ascribed to want of proper care and food. At Sumbhulpore, an elephant had every symptom of Cholera; but the affection of brutes was by no means general. Thus in Dacca, Mymensing, Rajshahye, Nuddea, Bhaugulpore, Tirhoot, Sarun, &c. the lower orders of animals are expressly stated to have enjoyed their usual health; so that the circumstance of their sickness in other quarters, during the prevalence of the Epidemic, may have been perfectly fortuitous.

SECTION VIII.

THE SYMPTOMS OF CHOLERA.

In order to afford my readers a most accurate description of the symptoms of the disease, as it was developed at different stations and at different seasons of the year in India, I shall principally depend upon Mr. Jameson's compilation, who is not only minute in describing the Epidemic as it prevailed in all parts of the country, but has left nothing to be said as to its mode of attack and termination. Mr. Jameson opens his description by saying, that a vomiting and purging of a pale and watery fluid, either concurring or alternating with each other, formed the leading symptoms of this disorder.

The attack was generally ushered in by a feeling of fulness, and pain in the stomach, and swelling of the abdomen; with sickness, and a desire to go to stool. Then came almost immediately, vomiting and purging of a pale, thin fluid, without taste or smell; great anxiety, oppression, and sense of constriction about the heart and præcordia; thirst and internal heat. These symptoms were accompanied, or quickly followed, by severe cramps; generally beginning in the fingers and toes, and thence extending to the wrists and forearms, calves of the legs, thighs, abdomen, and lower part of the thorax.

Together with these signs of general depression, the action of the heart and arteries was uniformly diminished. The pulse sunk rapidly at the wrists and temples; and at last could no longer be felt, or was merely perceptible by a slight and indistinct fluttering. The respiration became laborious and hurried, with sighing, and long and frequently broken inspirations. As the blood forsook the extreme vessels, and withdrew to the great cavities, the exterior surface of the body grew pale, shrunken, and cold. The skin became clammy, dank, disagreeable to the feel; bedewed with large drops of cold sweat, and discoloured of, a

leaden, bluish, purple, or livid hue. The countenance was greatly changed, the features were contracted, collapsed, and ghastly. The eyes sunk in their sockets, fixed and glassy, covered with a thick film, heavy, dull, suffused, and surrounded by dark-brown, or black circles; the lips livid, or of a purple colour. The finger-nails blue, the palms of the hand white, bleached, and puckered into folds. The mouth was dry and parched; the tongue bluish, or white, and faltering; and the voice hoarse and low.

There was sudden and great prostration of strength. The hands trembled; and the action of the voluntary muscles was uncertain and unsteady. The patient could no longer stand or walk without assistance; he became as feeble as a child; staggered like a drunken man, and unless supported, sunk down like one in the last stage of debility from Fever.

In feeble habits, and where the disease attacked in extreme violence, the scene was soon closed. The circulation and animal heat were never restored. The spasms, vomiting, and purging were frequently renewed; the thirst continued incessant and unquenchable, and was no sooner gratified by draughts of water, or other fluid, than dreadful retching ensued. The burning heat, anguish, agitation, and restlessness, continued unabated. At length, the patient exhausted by the depressing influence of the malady, and the repeated large discharges, fell into a listless state, and had no longer strength for either full vomiting or purging. A little fluid was now only ejected by the mouth, as the abdominal muscles were thrown into spasms; or passed off involuntarily downwards, as the body turned round in bed. The patient remained deadly cold; grew weaker and weaker, and insensibly sunk into death; or was carried off during a repetition of spasms; sometimes in one, but more frequently within four, six, or twelve hours.

Such was the general appearance of the disease, where it cut off the patient in its earlier stages. The state of collapse sometimes, however, lasted much longer before it ended in death, which it almost certainly portended. It was often attended by a remarkable degree of listlessness. The patient seemed wholly unaware of his extreme danger; or quite careless of its consequences. He wished to be left to himself; and the spasms having now ceased, he lay

motionless; being only roused at long intervals, as the sickness recurred, or as his thirst reminded him to call out for water. The amazing eagerness with which he seized the vessel, and gulped down the fluid, when he knew it would be followed by instant vomiting, shewed how all was burning within.

Much variety, however, occurred in the kind, order, and consequence of the symptoms, according as the nature of the disease happened to be more or less concentrated, or the individual affected of a strong or feeble constitution. Vomiting was the symptom of earliest and most frequent occurrence. Next came purging, then the cramps, and spasms. Frequently, however, this order was reversed, and the purging and spasms took the lead of the vomiting. Sometimes the cramp preceded both, sometimes there was no vomiting; sometimes no purging; sometimes no spasm, throughout. Sometimes all these symptoms were simultaneous; and the vomiting and purging took place together, as if caused by sudden contraction of the alimentary canal in its whole extent. In some rare instances, the virulence of the disease was so powerful as to prove immediately destructive of life, as if the circulation was at once arrested, and the vital powers wholly overwhelmed. In these cases, the patient fell down, as if struck by lightning, and instantly expired. Others, again, sunk after making one or two feeble efforts to vomit, and drawing a long and anxious inspiration. Some recovered from the insensibility produced by the first shock, and afterwards went through the regular course of the disease.

The irritability of stomach, and vomiting, formed a very distressing part of the disorder. They were generally preceded by a feeling of giddiness, and inclination to faint, by fulness, tension, uneasiness, and pain, especially about the pylorus; as if the contents of the stomach were in vain soliciting a passage into the duodenum. The fluid ejected was watery, mostly tasteless, transparent, or of a whey or ash colour. Sometimes it was sour, green, dark, like infusion of tea, starchy, mixed with mucus, and viscid. In very rare instances, where the vomiting was excessive or kept up for many hours, pure bile was thrown up; but the disease was almost universally characterised throughout its progress, by a total absence of this secretion from

the whole course of the alimentary canal. Sometimes, the food last taken in was thrown up before the commencement of the watery discharges; but this was not usually the case; for frequently after death, indigested lumps of ingesta were found floating in the stomach; clearly proving, that the action of that organ, however inordinate, was not always complete, or sufficient for its entire evacuation. The vehement, insatiable thirst always present, tended greatly to aggravate the irritability of the stomach; for it was hardly possible to keep the patient from drinking large draughts of cold water, which were no sooner swallowed, than they were ejected, with a quantity of phlegm, or whitish fluid like gruel, solution of starch, or seethings of oatmeal. The vomiting proved by far the most intractable symptom of the disease; generally keeping up long after the looseness and spasms had subsided; and even in cases which terminated favourably, harassing the patient, and retarding his recovery during many days.

The dejections were much of the same nature with what was passed upwards; generally watery, colourless, white or muddy, sometimes red and bloody, sometimes greenish and pulpy, like half-digested vegetables. To those who have not seen persons labouring under the disorder, it will not be easy to convey an idea of the enormous extent of these discharges. It seemed, as if the whole fluids of the body would have been insufficient for their supply; and that they very sensibly diminished the mass of the blood, was shewn by its thickness, and unwillingness to flow upon a vein being opened; and by the check uniformly given to all the secretions. The evacuations were sometimes poured forth in a rapid and continued stream, as if from a sluice; at other times ejected in small volumes, as if from a syringe, by the violent action of the stomach and rectum. In no instance, was fœculent or bilious matter passed off in the commencement of the attack.

The spasms usually began in the extremities, and thence gradually crept to the trunk; sometimes they were simultaneous in both, and sometimes the order of succession was reversed; the abdomen being first affected, and then the hands and feet. They seldom amounted to general convulsion; but seemed rather affections of individual muscles, and of particular sets of fibres

in those muscles; causing in them quick thrilling and quivering, and firmly stiffening and contracting the toes and fingers. In old men, and in persons of feeble habit, they were generally slight, and hardly perceivable by the eye of a by-stander. Among Europeans, and among natives of robust make, they were most severe. With them the bellies of the gastrocnemii sometimes became as firm and stiff as a board, and hard knots could be felt in the fleshy parts of many other muscles. The torture caused by these contractions was exceedingly great. The patient always complained of pain across the abdomen, which was generally sore to the touch, and swelled from the scrobiculus cordis to the pubes, sometimes hard knotted, and drawn back towards the spine. The burning sensation of the stomach and bowels was always present; and at times extended along the cardia and œsophagus to the throat and mouth. When the stomach itself was seized by spasm, the pain was excruciating, and the patient screamed violently, and kept constantly tossing about. In some instances, the extreme violence of the spasms seemed in an early stage of the attack to destroy the nervous energy, and deprive the alimentary canal of all feeling, so that fluids of the most acrid and fiery nature passed down without producing the slightest sensation. The diaphragm frequently partook of the convulsive action, and gave rise to pain in the back and loins, and to severe hiccough, which shook the whole frame of the patient, and proved exceedingly distressing. Spasms of the intercostals and muscles of the neck were hardly ever seen, but partial and complete trismus were not of very rare occurrence.

The disturbed state of the circulation was an early and ever present feature of the disease. Almost immediately after the stomach became affected, the blood forsook the surface of the body and rushed into the heart and great cavities. This was proved by the lividity and icy coldness of the surface; by the heat of the præcordia; by the throbbing felt about the heart and great vessels; and by the dissection of those who died of the disease. The smaller arteries soon ceased to act, and the heart performed its functions imperfectly and with great apparent difficulty. The hurried respiration, tossing anxiety, and frequent sighing and moaning, which invariably succeeded, were probably in part pro-

duced by the accumulation of blood in the chest, and by the ineffectual efforts of nature to restore the balance of the circulation, by propelling it to the extremities.

The participation of the heart and arteries in the general derangement of the system was not, however, in all cases immediate or uniform. Sometimes, they seemed to be but little affected; and the pulse could be felt beating regularly, and of good volume, long after the irritability of stomach and frequent spasms had evinced the violence of the disease. More generally, however, the action of the heart was speedily diminished, and within a space, varying from fifteen minutes to two, three, or four hours, the pulse gradually failed, until it could no longer be distinguished at the wrists or temples, or even under the axilla. An almost imperceptible fluttering in the region of the heart, an attempt to retch, or a deep groan, as the spasms attacked the vital parts, were then barely sufficient to prove, that life was not yet wholly extinguished. The pulse, so long as it could be felt, was mostly very feeble and tremulous, regular, soft, and not very quick, usually ranging from 80 to 100. In a few instances, it rose to 140 or 150, shortly before death. Then it was distinct, small, feeble, and irregular; sometimes very rapid, then slow for one or two beats.

Along with the suspension of the general circulation, an almost entire cessation took place in the action of the secerning vessels. The saliva was dried up, the mouth became dry and parched, and the tongue deeply furred: white, yellow, red or brown. It was not easy to determine how soon the kidneys ceased to perform their office; because what urine the patient made early in the disease, would be passed unobserved, during the frequent occasions to go to stool. But, there is reason to believe, that there was generally partial or complete ischuria, which, if the patient survived, frequently lasted several days; as was proved by his making no water, long after the purging had ceased. That there was sometimes spasms of the kidneys, along with their state of complete inaction, was concluded from the severe pain experienced in the iliac regions. The retention of the urine being in some cases preceded by pain and irritation at the neck of the bladder, and over the pubis, it was at first imagined, that it might

be caused by a mere suppression, but no fluid came away upon the catheter being passed.

In this disease the head was less affected than any other part of the body. In some cases, indeed, the early appearance of giddiness, swimming, blindness, pain over the eyes, redness of the conjunctiva, and contraction of the pupil, deafness, and ringing in the ears, might have led to a supposition, that the brain was the primary seat of the disorder. But these symptoms were by no means of general occurrence; and the conjecture founded upon them was contradicted by the almost uniformly unclouded state of the mind in the early parts of the attack. In the midst of all the agony, which he endured, the patient was calm, and perfectly collected. At no time of his life, probably, was he more rational, and sensible to all that was going on around him. In the latter stages of his illness, it is true, he sometimes began to wander, or sink into a hopeless state of insensibility. But this is not to be wondered at; for then his sensorium was oppressed by an unusual congestion of blood in the brain; and his mental and bodily powers were wholly exhausted by previous great suffering and diminution of the circulatory fluid.

It has been stated, that where the disease attacked in extreme violence, or seized persons of weakly habits, the energies of the system seemed to be at once exhausted; and death occurred without any attempts at re-action. Where, however, the strength of the patient's constitution, or the efficacy of the curative means administered, although indequate wholly to subdue the disorder, were yet sufficient to resist the violence on its onset, nature made various efforts to rally, and held out strong, but fallacious promises of returning health. In such cases, the heat was sometimes wholly, at other times partially restored; the forehead, chest, and abdomen, in the latter case becoming warm, whilst the limbs kept deadly cold. The pulse would return, grow moderate, and even full; the cramps and vomiting disappear; the nausea diminish, and the stools become pitchy and fœculent. And yet, with all these favourable appearances, the patient would suddenly relapse; chills, hiccough, want of sleep, great anxiety, and delirium, would arise; the vomiting, oppression, and insensibility return, and in a few hours terminate in death. In these cases, the

eyes were not uncommonly fixed in their sockets some time before death. The patient stared vacantly, and could not be roused from the lethargy into which he had fallen. Sometimes, again the symptoms immediately preceding the closing of the scene were somewhat different. The anxiety and restlessness were heightened; muttering delirium came on; the breathing grew short, hurried, and stertorous; and the sufferer sank in the midst of the greatest mental and bodily anguish. Or he would suddenly expire as he turned in bed; when the previous abatement of all bad symptoms, and when the apparent return of the circulation held out the fairest hopes of recovery. Nor was it very uncommon to see a patient in this state at once seized with universal cramp, which extinguished life in a moment. Hence, many were found dead in their beds; when no previous intimation by groan or other sign of distress, had been given to those lying alongside, of their approaching fate.

When the disease ran its full course, the symptoms were variously modified, according to variety in the type of the Epidemic, or constitution of the individual affected. It will not be supposed, that all the appearances above described, were present at all times, and in every case. In the several periods of its revolutions, and in the infinite variety of individuals attacked, the disorder was of very different degrees of violence; from simple vomiting and purging, with little or no cramp, to universal spasm, incessant retching, and total depression of the vital powers.

Among natives generally, where the attack was exceedingly severe, the constitution sunk with scarce an attempt to rally; and of those who recovered, the secondary stage was of short duration, and unaccompanied with much reaction. In the milder cases, the attack either was repelled by the unaided powers of life itself, or readily gave way to the simplest means of cure. The pathognomonic symptoms of the disease speedily abated; the patient sunk into a profound and quiet sleep; and the breaking out of a warm equable perspiration all over the body, evinced the restoration of the vital powers, and might be considered an almost infallible sing of recovery. In such cases, slight debility and irregular action of the intestinal canal were the only ill conse-

quences of the attack; and a copious discharge of bile, or fæculent matter, either natural or procured by the exhibition of a single dose of a simple purgative, completed the cure.

But in the more violent forms of the disease, recovery was longer protracted, and the sufferings of the patient were more severe. After the most distressing symptoms had been in great measure subdued, he was still harassed by constant thirst, irritability of stomach, pain and soreness of the epigastric region, watchfulness, and confused dreams. The stomach and bowels did not for a long time regain their usual tone, and the frequent occurrence of obstinate Dysentery or Diarrhœa proved, that almost irreparable mischief had been done to the whole of the chylopœtic viscera. In these cases, the debility was great and of long duration; and the strictest attention was required during many days to prevent the patient from sinking entirely. Sometimes the debility terminated in incurable dropsy. In some instances, partial loss of vision, in others, of hearing, ensued. In one man, paralysis of the bladder and lower extremities occurred early, and continued long after the cessation of the common symptoms of the disease.

It was almost uniformly observed, that health was soonest restored in those cases in which feculent, black, and acrid motions were early procured; and that on the other hand, their absence was almost uniformly marked by feverishness, sour eructations, flatulence, constipation, and other signs of want of tone and sluggish action of the hepatic system. Fevers of the remittent and intermittent type were among the most frequent sequelæ of the disorder; but among natives, and especially those of weakly frame, they could not be considered to form an essential part of the attack. They were hardly ever immediately superinduced upon the collapsed stage, and seemed rather an incidental affection in bodies much predisposed to take on new forms of disease by great existing debility.

When the disease ran its full course with Europeans, and with natives of robust, athletic make, the following appearances generally presented themselves. What may be termed the cold stage or state of collapse, usually lasted from twenty-four to forty-eight hours; and was seldom of more than three complete days' duration. Throughout the first twenty-four hours, nearly

all the symptoms of deadly oppression, the cold skin, and oozing of clammy sweat from every pore, the feeble pulse, occasional vomiting, purging, and cramps, the thirst and anguish, continued undiminished. Then the system shewed symptoms of revival; the vital powers began to rally; the circulation and heat to be restored; and the spasms, sickness, and desire to go to stool, to be considerably lessened. The warmth gradually returned; the pulse rose in strength and fulness; and then became sharp, and sometimes hard. The tongue got more deeply furred, and the thirst continued with less nausea. The stools were no longer like gruel or rice water; usually between the third and sixth day, they became first brown and watery; then dark-green, black, and pitchy; and the bowels during many days continued to discharge immense loads of vitiated bile; until, with returning health, the secretions of the liver and other viscera gradually put on a natural appearance. These discharges were generally hot, acrid, and passed with griping and tenesmus. Sometimes they were of a bright yellow colour; and the surcharge of bile was so great, as to be ejected in a pure stream from the stomach. It was remarked, that where the motions consisted of a chocolate coloured fluid, with floculi swimming in it, the patient rarely recovered.

The fever, which almost invariably attended this second stage of the disease, may be considered to have been rather the result of an effort in nature to recover herself from the rude shocks which she had sustained, than as forming any integrant and necessary part of the disorder itself. It partook much of the nature of the common bilious attacks of these latitudes. There was the hot dry skin; the foul, deeply furred, dry tongue; parched mouth; thirst sick stomach; depraved secretions; restlessness; watchfulness, and quick variable pulse, sometimes with delirium, stupor, and other marked affections of the brain.

Generally, when the disorder proved fatal, after reaching this stage, the tongue, from being cream coloured, got brown, and sometimes black, hard, and more deeply furred; the teeth and lips were covered with sordes; the state of the skin varied, chills alternating with heats; the pulse became extremely quick, weak, and tremulous; hiccough, catching of the breath, great

restlessness, and deep moaning succeeded; and the patient soon sunk, incoherent and insensible, under the debilitating effects of low nervous fever, and frequent dark, tarry, alvine discharges.

In other cases, this secondary period ran a somewhat different course. As the action of the heart and arteries was renewed, and the natural warmth of the body returned, an unusual degree of energy succeeded. The brain was evidently affected; and the patient was quite insensible to the great danger into which he had fallen. The pulse rose as high as 120; great heat, especially over the large cavities, was complained of. There was extreme agitation and distressing thirst. The patient continually called for cold water, to relieve the burning sensation of the abdomen; sometimes a warm perspiration broke out near the wrists and forehead, which afforded temporary relief to his sufferings. To this state of excitement, that of collapse quickly succeeded. There was then great prostration of strength, the bowels became quite torpid, severe pains occurred low down in the abdomen, near the seite of the rectum, which were always aggravated upon stools being procured by medicine. The state of the stomach now excited surprise; its unnatural irritability was entirely gone, and the most nauseating medicine could be poured into it without exciting vomiting. It rarely occurred, that the patient survived the great sinking produced by this stage; and even where the strength of his constitution carried him through it, he suffered long after from debility and disordered bowels.

The attacks of this disease sometimes came on at once, without previous warning; sometimes various signs betokened their approach, according to the existing state of the Epidemic, and of the individual affected. In large cities and in camps, where the disease existed in full force, and the Epidemic was peculiarly concentrated, persons in previous perfect health were frequently seized in a moment, without any apparent cause. Where again, the disorder prevailed in no very malignant form, healthy individuals were sometimes at once brought under its influence, from marked errors in diet, or sudden exposure to other powerful exciting causes. Where, however, neither of these circumstances obtained, the attack was usually preceded by various symptoms of derangement of the alimentary canal, anorexia, nausea, sickness

of stomach, and costiveness. To these, a looseness would perhaps succeed, which kept on for a day or two, till the patient was at once seized with vomiting and the other pathognomonic signs of the disease, upon drinking a draught of cold water, or incautiously going into cold air, with a perspiring skin. In many cases, general lassitude and shivering preceded the attack. In some persons, who, under the alarm produced by these ailments, had recourse to purgatives, immense quantities of black bilious matter were passed off, shewing perhaps, previous deranged state of the hepatic functions.

The general appearances of the disease being thus described, it will be right, before proceeding further, to speak shortly of the varieties assumed by it in its different points of attack. This digression will not, however, occupy much time; for throughout its long and destructive track, and among the myriads whom it affected during its progress, the Epidemic exhibited perhaps less variety, and fewer discrepancies, than any general distemper to which the human body is subject.

To begin with Bengal. During the first two years in which it more or less harassed Calcutta, it appeared in every degree of mildness and severity, amongst the various castes and classes of persons. The only general remark that can, therefore, be made here is, that spasms and subsequent reaction were more remarkble among the Europeans; immediate collapse and prostration of strength among the natives. It was more generally fatal perhaps in February, 1818, than in the preceding autumn, and yielded less readily to medicine.

At Jessore, Backergunge, and Mymcnsing, it has subsisted during an equal length of time, sometimes in greater, sometimes in less vigour; but decidedly with greater and more general fatality, in the earlier months than in 1820. In these districts and in the vicinity of Bullooah, near the mouth of the Ganges, at first hardly any of those attacked recovered without medicine.

In Dacca, where it has been from July, 1817, without any period of intermission, there seems to have been nothing particular in the form generally assumed by it.

In Sylhet, it was far more destructive in the latter part of 1818, than it had been during the former year; proving fatal in a

much shorter spaee of time, and resisting the powers of remedies, which formerly effected a cure. If nothing curative was attempted for an hour, the case was then considered hopeless.

From November, 1817, to November, 1818, in Tipperah, the Epidemic exhibited considerable variety. Sometimes it was attended with no vomiting; sometimes there was no pain in the bowels, nor generally spasmodic affection. There was always great prostration of strength. The disease was milder towards the end than in the commencement. In the other districts of Bengal, there was nothing unusual in the appearances of the disease.

At Chuprah, at first, the violence of the spasms chiefly attracted attention, latterly its type was modified. The distinctive marks of purging and vomiting still obtained, but the spasms were not so severe or constant, and the attaek was not so sudden; being generally preceded by a sense of indisposition, and pains about the abdomen and neck of the bladder. In both periods the egesta during the attack were similar, but in the latter the voiding of worms was a common occurrence; and in cases, in which stools were procured by medicine, scybala generally came away.

At Dinapore, whilst the Epidemic destroyed numbers in its usual mode, it not unfrequently appeared in a different and equally fatal form; in which vomiting and purging were wholly absent, and the body was universally affected by spasm. The form oeeurred equally among Europeans and natives.

In Tirhoot, spasm seareely ever appeared, and the pressing symptoms were general depression and discharges from the bowels. At Mullhye again, and other places on the Eastern frontier, cramp of the extremities was of common occurrence.

Between Patna and Benares, the symptoms were immediate depression of the vital powers, languid circulation, and coldness of the surface. At Benares, in the hot weather of 1818, the Epidemic appeared in its usual shape; but in the ensuing rains many persons died with the following symptoms. The individuals complained generally after eating of great pain of stomach, faintness, and a sense of sinking, as if life was quitting them; and unless relieved, they soon expired. A great seareity of grain then existed

in the city, and the sufferers were generally of the poorer class, and debilitated by the want of nourishing food.

At Cawnpore, and in the Doab, and the districts east of the Ganges, the disorder kept its usual course, and was generally followed by debility and slight bowel complaints.

In the centre divison of the army, Europeans were generally affected in the following manner: They first complained of severe pain in the abdomen, particularly about the umbilicus. Then violent vomiting and purging of a fluid like rice water came on, and was followed by severe spasms in the extremities and muscles of the belly. In some instances, the patients were suddenly attacked with cramps, without any discharge from the alimentary canal. The countenance was ghastly in the extreme, in the commencement of the attack. Then succeeded the usual appearances of cold, clammy, blue skin, sunken eyes, shrivelled fingers, want of pulse, dry parched mouth, and thirst. In some the pulse remained, and was then quick, and of a wiry feel. In almost all, there was complete ischuria, and in those who survived, no water was passed during many days. The contractions of the muscles in the limbs were remarkably painful and distressing. Where curative means were not applied, or failed in giving relief, the patient usually perished within twenty-four hours. A curious symptom was sometimes observed immediately previous to dissolution. When fluid was administered to the sufferer, he collected it in the corner of his mouth, and then squirted it out with great violence; and this at a time, when he was so exhausted as to be incapable of the slightest general exertion. The early symptoms among natives were similar in kind, but less in degree. The spasms were feebler and the debility more striking. In many the exhaustion was so great, that they could not articulate. The abdominal muscles frequently remained relaxed and flaccid. In others, they were, together with the viscera and muscles of the upper and lower extremities, thrown into violent spasmodic action. The fingers and toes were blue and contracted, and their last phalanges curved inwards. The pulse in many could not be felt in the carotids. The buccinator muscles fell in; and the whole face was hollow and haggard. The fluid ejected upwards was usually colourless; that downwards, watery and muddy, sometimes bilious. Towards the last stage, a thick film came over the ball of the eye; the tunica

conjunctiva was suffused with red blood; the countenance assumed a sharp hippocratic appearance, and some hours before death was so depressed and altered, as not to be readily recognised. The corpses of such as died looked, immediately after the breath was gone, like bodies that had been long dead, so wan and sunken were they. It was not, however, remarked, that putrefaction took place sooner than in such as die from ordinary ailments. As the powers of life were more readily destroyed in the weakly frames of the natives than in the European, with them death occurred proportionally earlier. Many accordingly died between the first and the twelfth hour of the attack. It was singular, that neither with Europeans nor natives were those symptoms of strong reaction, and subsequent fever, observed, which, among the former, at least, were of almost constant occurrence, in the lower parts of India. Debility, disordered tone of the stomach and liver, Dysentery, and Diarrhœa, formed the usual sequelæ. In many, recovery was remarkably rapid; and even in the severest cases, the constitution did not appear to have suffered any parmanent injury, and the patient generally regained his former health and strength in one, two, or at the farthest three months.

In the left division of the army, spasms and excruciating burning in the stomach were very generally present, with the other diagnostic signs of the disease. Suffusion of bile, Fever, Chronic Diarrhœa, and debility, were its ordinary consequences.

In the Nagpore division, the symptoms were extremely violent, and frequently carried off the patient in four or five hours. The depression was always exceedingly great, with dim glistening eyes, headache over the eyebrows, gnawing, lightness of the stomach, burning, and thirst. The spasms of the trunk and limbs were not uniformly present; sometimes they were slight, sometimes severe. The vomiting and purging occurred together, or alternately, and in every degree of violence. The pulse was sometimes full and steady; at other times weak and intermitting; and occasionally even a total cessation of arterial action took place. Strangury was not uncommon. The skin, though generally cold and moist, was sometimes dry and hot. The only general after-effect of the attack was extreme debility.

Among the troops of the Rajpootana force, the disorder was more violent in the middle than in the early or latter part of its

visit. In Europeans, and at first in natives, the severity of the spasmodic affections of the extremities was chiefly remarkable, the balance of the circulation was not greatly disturbed, and the pulse did not greatly fail. Towards the middle periods of its stay, the cramps were hardly to be observed among the natives. The morbific agency was then so powerful as immediately to arrest the circulation, and produce entire exhaustion. The total want of pulse, coldness of body and extremities, prostration of strength, and wrinkling of the skin of the hands and feet, were then the principal marks of a state, from which it was hardly possible to rouse the patient, even when the vomiting and purging were allayed. Latterly, the presence of the disorder was barely discernible in the slight evacuations and feeble twitches accompanying its attacks. Fever was a rare consequence of the disease. Extreme weakness, irritable stomach, irregular action of the bowels, and in very few cases Dysentery, formed its usual sequelæ.

In Jeypore, the attack was always preceded by general lassitude, frequently ending in shivering like that of an ague fit. Then succeeded severe pain of belly, followed by vomiting and purging, cramps, and the usual train of symptoms. A looseness, lasting four or five days, sometimes came after the attack; but generally the sufferers recovered surprisingly fast; in some instances in a few hours.

In the Hansi division, the symptoms coincided with those enumerated in the general description. Vomiting was more violent in some, purging in others. Excessive restlessness, burning heat in the bowels, and spasm in the extremities, were present in almost every case. Of those who recovered, many had to undergo Fevers of the Remittent or Intermittent type, before they regained their health. Bowel complaints were very rare; greater or less debility was present in all.

At Delhi, Meerut, Coel, Agra, and Futtihgur, as the disease was generally milder than in other parts of the country, it ordinarily left no other ill effects than weakness and disordered bowels.

Having thus described the symptoms of this tremendous disorder, let us now see what were the effects produced by it, in disorganising the human body, and deranging its most important functions.

SECTION IX.

APPEARANCES AFTER DEATH.

Of those who died in Calcutta, it was believed, perhaps rather fancifully, that the bodies sooner underwent putrefaction than the remains of persons dying under the ordinary circumstances of mortality. In many, a striking proof of the unnatural accumulation of blood in the great cavities, was afforded by the thorax and abdomen continuing preternaturally warm for many hours, when the limbs were cold, livid, and stiff.

The bodies of such as had sunk in the earlier stages of the malady, frequently exhibited hardly any unhealthy appearance. This was more especially observable among Europeans of weak and sickly constitutions, and among natives of the poorer classes. On laying open the bodies of such persons, it was remarked, that the abdomen emitted a peculiar offensive odour, very different from the ordinary smell of dead subjects. In them there was not the slightest mark of previous increased vascular action throughout the whole intestinal canal, which rather appeared paler than usual, and flabby, and was filled with an amazing quantity of whitish or muddy fluid, or empty and inflated with air. Sometimes in the stomach this fluid was found mixed with pieces of curdled matter, or lumps of indigested food. This appearance of relaxation was not confined to those in whom the spasmodic affections were absent. It occurred frequently where the cramps of the abdominal muscles had been violent, and the pain in the stomach excruciatingly severe.

On laying open the abdomen of such as had lived sometime after the commencement of the attack, and especially of Europeans and the stouter natives, a different set of appearance was brought into view. The omentum and mass of intestines were often found displaced, and preternaturally vascular, with partial adherence, between the diaphragm, liver, and surrounding viscera.

The colour of the intestines varied from deep rose to a dark hue, according as the increased vascular action had been arterial or venous. In some instances, the outer surface of the stomach likewise was florid, and its veins turgid with dark blood. This organ was, however, much contracted, and its substance hard and frequently thickened. On cutting into it, it was found sometimes partially, and at others largely filled with fluid of various colour and consistence; thin and transparent, milky, green, dark, grumous, or muddy. Sometimes, this fluid was black, like lamp-black, sometimes it consisted of pure blood, and at other times of blood mixed with bile. On removing this, the inner surface was frequently seen lined with coagulable lymph, bloody gelatine, or a muddy glary viscid matter, which on being washed away, brought the highly inflamed coats into view. Of these, the appearance was various; generally they were crossed by streaks of a deep red, interspersed with spots of inflammation made up of tissues of enlarged vessels. Sometimes the inflammation was florid and bright coloured, so as to give the whole inner-surface of the organ the appearance of a minutely injected anatomical preparation. In some instances, ulceration had begun, and the villous coat was partially abraded; in others, incipient mortification had occurred: and the coats were puckered into net work, or drawn into folds, with patches of red near the pylorus.

The intestines were sometimes largely inflated with air, at other times flattened and corrugated, and sometimes partially contracted. From violent action and reversed peristaltic motion previously to death, intus-susception of the large and small guts frequently occurred. Instances of this kind happened in two or three places; and the portion of detached intestine was nearly a foot in length. On cutting into the intestines, the smaller guts were observed to be more inflamed than the larger. The duodenum, and more particularly its upper portion, was generally similar in morbid appearance to the stomach, corrugated, inflamed, with florid or deep red patches and streaks. In cases of several day's standing, the inner coat of the small guts was ulcerated, and they were filled with sanies, having portions of lymph floating in it. Then the large intestines were lined with a dark, thick, pitchy matter, poured out from the liver, as it had begun to renew

its action. In such as died early, the fluid was limpid, or muddy, with cheesy matter at times floating in it. In general, neither bile nor fæces were seen in the intestinal canal. The colon and rectum were frequently contracted and inflamed, in their whole extent. The former, more particularly near its sigmoid flexure, was sometimes not of the thickness of a finger. The inner surface of the rectum, near its termination in the anus, was in some instances abraded; in almost all highly vascular.

The appearance of the liver was very various. In most cases, and in nearly all young plethoric subjects, it was enlarged and gorged with blood, which flowed profusely, and sometimes spouted up, on a scalpel being plunged into any part of it. In a few, it was large, soft, pappy, light-coloured, with greyish spots, and not much distended. In others again, it was collapsed and flaccid. In some rare cases suppuration was discovered to have taken place, and a pint and a half of good pus was found in one, who had been ill only twelve hours, and who had not complained. These appearances were probably accidental.

The gall-bladder was generally full of dark-green or black bile; sometimes it was empty, or loose, with a quantity of thin, pale or light-coloured fluid. In many the liver and gall-bladder had no mark of diseased action. The hepatic duct was usually enlarged and relaxed, the ductus communis generally contracted, and in several instances obstructed by gall-stones.

The spleen was of softer texture than usual, uniformly enlarged and distended with blood. The kidneys presented no unusual appearance. The urinary bladder sometimes partook of the general inflammation; but it was usually quite empty and shrunk, so as to be raised with difficulty from the inner surface of the pubes.

The great venous trunks in the abdomen, and particularly the mesenteries, and vessels of the portal circle were uniformly enlarged and distended. The vena cava was sometimes thick and hard, like a sausage. The lacteals were turgid with chyle, so as frequently to have a tortuous knotty appearance. In the thorax the same marks of great internal accumulation were present. The heart and great blood vessels were stuffed with clotted blood, and the lungs were black, collasped, and preternaturally

heavy. The inner surface of the œsophagus was somctimes imflamed and ulcerated. In other respects the thoracic viscera were sound.

The brain was generally of natural appearance, especially in those who died early. In some cases there were various marks of venous congestion and incipient inflammation. The sinuses, and vessels leading to them, were turgid with dark blood. Partial adhesions, and deposition of lymph, were observed to have taken place between the dura and pia mater, near the caronal suture, and towards the occiput. Serous effusion likewise occurred in a greater or less degree between the membranes, or in the ventricles. In one or two rare instances the sinuses had given way from over distension, and a great quantity of blood was found poured out on the surface of the brain. In cases of persons affected with stupor previously to death, a quantity of fluid escaped immediately upon puncturing the dura mater, and much serous effusion had taken place throughout the cavity of the brain, with partial thickening and inflammation of the meninges.

This description may be closed with a short recapitulation of the morbid appearances, as they were modified in situations in which there was a large field for observation. In the centre division of the army, among Europeans, they were very contradictory. In many, particularly of such as died early, the stomach and intestinal canal were found full of muddy fluid, without the slightest mark of inflammation. In others, the vessels of their inner coats were turgid, sometimes highly inflamed, ulcerated, and gangrened. The stomach was frequently thickened and contracted and the small intestines full of hard knots from one portion being forced into another. The liver was congested, inflamed, and darker than usual. The gall-bladder overloaded with dark bile; the ducts distended and relaxed. The thoracic and cerebral viscera sound. Among natives, the alimentary canal in its entire column, was uniformly seen full of a muddy fluid, and its inner surface lined with a clayey substance of the same nature. The quantity of this earthy-looking stuff was sometimes so large as in a manner to plaster the villous coat, and to leave a thick sediment on passing through the sheet in which the corpse was wrapped. Slight traces of inflammation were occasionally observed; but in most instances, no mark of increased vascular action was

perceptible. The liver was sound and the gall-bladder filled with viscid, pitchy bile. Neither in Europeans, nor in natives, was any tinge of that secretion discovered in the intestinal canal. In the Jubbulpore force, the stomach and intestines were found filled with a limpid fluid, and in some partially inflamed. The liver exhibited various appearances; in some it was turgid, and easily lacerable; in others flabby and collapsed, The gall-bladder was in some distended with blackish fluid; in others nearly empty. The contents of the head and chest do not appear to have been examined. In the Nagpore force, the interference of relatives generally prevented the inspection of the bodies of the dead. In the Rajpootana division, the morbid appearances were nearly as described in the Jubbulpore force. In the Kurnaul division, the abdominal viscera generally appeared as if gorged with blood; the stomach was filled, and sometimes distended with muddy water. In Europeans some marks of inflammation were observable; but in natives the surfaces of the stomach and intestines were perfectly pale. The liver and gall-bladder were healthy; with bile of natural colour and consistence in the latter. The spleen was of softer texture than usual.

SECTION X.

PROXIMATE CAUSE.

I NOW proceed to give my own view of the proximate cause of the disease. By this term I would wish to be understood to describe the morbid appearances present on the attack of Cholera, consisting of collapse on the surface, and congestion in the large vessels and the whole organic system of the internal parts. In consequence of these effects, accumulated stimuli in the internal organs ensue, which is incipient inflammation. Under the irritation of the nervous system, there is an increase of the peristaltic action of the bowels and an undue excitement of the stomach. Thus we have a definable cause for vomiting, purging, and spasm; the slow and almost imperceptible pulse, the shrunk features, and cold skin, being the effects of the collapse.

I shall endeavour to establish the doctrine I have advanced, not by fanciful hypotheses or questionable deduction, but by the most eminent authorities, and the clinical experience of the principal medical officers in India. I do not hesitate to declare it as my decided conviction, that sudden check to perspiration is the immediate cause by which the effects witnessed in Cholera are induced. It is an acknowledged fact, that there exists a sympathy or connection between the skin and internal organs. This connection is manifested in a two-fold manner. The excretions which are not passed by the bowels and kidneys, are taken up by the absorbents and exhaled through the pores of the skin; the quantity of those secretions being proportionable to the perspiration. The superabundant heat of the system is in the same way discharged by insensible exhalations; by means of which the body is kept in a cool state as long as the evaporation takes place on the surface. When, therefore, the perspiration is interrupted, the bowels become overloaded, the larger vessels are distended with blood, the increased exertion of the

nerves to remove the load and push the blood onward, occasions violent pains, and the urine is hot and scanty, indicating an accumulation of heat. The action of the stomach and bowels being further excited, their contents are soon discharged, after which, under a continuance of the exertion, nothing but a watery fluid is passed. The whole nervous system now partakes of this irritability which brings on spasmodic cramps of the toes and fingers, and contracts the muscles of the limbs into large balls. The muscles of the abdomen also are contracted together. The whole volume of blood being thrown into the larger vessels, the bowels, stomach, brain, and the tunica conjunctiva are filled with congested blood, and the internal heat becomes inexpressible. The surface of the body is cold and clammy. In twenty minutes the countenance becomes haggard, the eyes sink into their sockets, and are covered with a glutinous film. The convulsions increase, accompanied with excessive thirst, and the respiration is broken and difficult; such are the consequences attendant on a sudden check being given to free perspiration.

The history of Cholera manifests, that from the humidity of the atmosphere, during periods of Epidemical influence, and the sudden changes to which it is then liable, the constitution is at such times peculiarly exposed to a check of perspiration. The month of May is described to have had more cases, and of a nature more virulent than any which occurred during other months in the year; and on referring to the accounts which we have of the atmospherical phenomena of that month, we discover sufficient cause for epidemic affections, on the principle which I maintain. For during May, the weather is moist and cloudy, and great heats prevail, with occasional falls of rain in the day; while the nights are calm and sultry during the early part, but cold and chilly from the east towards four o'clock in the morning. The effects of these great diurnal vicissitudes upon the human body are very striking, in producing profuse perspiration, relaxation, and great nervous irritability; thus rendering the frame, especially during sleep, extremely sensible to external impressions, and disposing it for the reception of this Epidemic. In this state, it is acted upon by the damp wind and dew of the morning; a strong check is immediately given to the violent perspiration; the blood,

as before mentioned, is driven towards the centre; and that disturbance of the system which I have noticed is superinduced.

How the body is moist and cold on the surface, while great inflammation is going on in the centre, must now be shewn; for if we reason from analogy, there seems to be a contradiction in the assertion that such is the case. That inflammation may exist internally, and to a considerable degree, while the skin is cold, with a clammy sweat, will appear, if we consider that when the skin is in a profuse perspiration, a partial check takes place on a sudden exposure to a blast of wind; and that by a rapid evaporation on the surface, cold is produced, by which the blood is repulsed from the surface to the centre. The skin does not, as might be expected, immediately become dry and hot: but as a serous effusion results, in Fever and Apoplexy, from obstruction in the arterial and venous system, the effect mentioned, in like manner ensues on the skin and first passages. This accounts for the watery discharges by the bowels and stomach, as well as for the moisture which, exuding in large drops on the surface, produces the death-like coldness noticed in Cholera. It is precisely this state of the skin and appearance of the patient, which is witnessed in the last stage of Fever preceding dissolution, when drops of clammy sweat arise, all the urgent symptoms of heat cease, the features shrink, and the dying collapse of the countenance is exhibited.

Some, however, may be disposed to question the existence of these effects. They may allege, that inflammation could not, in this instance, ensue, because evaporation is a cooling process; for it is only when evaporation from the skin and lungs is prevented, and the cooling process suspended, that inflammation is produced, as is the case in Fever, the heat of the constitution being equalized by pulmonary and cutaneous evaporation. I shall therefore endeavour to shew, that the cutaneous exudation in Cholera is morbid effusion; that it is far from refrigerating the centre; and that, instead of disproving the presence of internal inflammation, it is in itself a symptom of that effect.

Let it be observed, then, that the application of cold, in some cases, produces instead of preventing inflammation. Treating of the direct causes of inflammation, Dr. Thomson observes:—

"The operation of cold upon the human body affords the best example which I can suggest of the production of inflammation from the operation of a power acting upon a part, at a distance from that in which the inflammation takes place." As instances of this kind, he remarks, that "the exposure of the feet to the cold, in one person, occasions an inflammation of the throat, in another, inflammation of the chest, and in a third, inflammation of the belly." Now, cold produced by excessive perspiration, partly checked on the surface by a current of wind blowing suddenly on it, has a similar effect. Dr. Thomson likewise takes notice of the peculiarity on which I have insisted. "It deserves to be remarked, (he says,) that a very unequal distribution of blood, and of course of temperature, frequently occurs in febrile affections. Thus the skin is sometimes cold when the interior parts of the body indicate a considerable rise of temperature. In these irregular distributions of blood, therefore, we observe two states of vascular or arterial action, one of which resembles inflammation in the heat, and increased pulsation; and another state, which is the very reverse of this, in which the capillary vessels are probably much diminished in size from the contraction of their muscular fibres."

It may be urged, that these facts are opposed to reason and analogy. So it was indeed for a long time supposed to be the case in Fever, and physicians were accustomed always to look for a dry and hot skin. That these symptoms are not, however, essential to inflammatory Fever, has been decidedly shewn in clinical practice; a cold and clammy skin, the reverse of hot and dry, frequently occurred, especially when inflammation and congestion took place in the centre. This it was which shook the foundation of Dr. Cullen's theory of Fever; for however ingeniously conceived an hypothesis may be, and however talented the propounder, all is negatived by the condemning facts brought to the test at the bed-side of a patient, and under the unerring scrutiny of post-mortem examination. The distinguished physician alluded to, attributed all the phenomena of Fever to a spasm, which he conceived to be induced in the extreme, or capillary vessels; a theory by which he readily accounted for the diminished perspiration. But, as it has been remarked, unfortunately for

this hypothesis, though it is one which seems to be justified by many of the morbid phenomena occurring in the animal economy, there have been Fevers in which a copious perspiration (or what I would call effusion) was among the first symptoms; and certainly still many more in which a profuse perspiration (or effusion) from the exhalents on the surface, formed one of the most troublesome and permanent symptoms with which the practitioner had to contend*. All inflammatory Fevers are ushered in with cold rigours, the blood receding from the ends of the fingers and toes, the individual complaining of languor and debility; the limbs totter, the pulse is weak, the features shrink, the eyes lose their lustre, the secretions diminish, the skin becoming cold, pale, clammy, and shrivelled, with irritation of stomach and bowels, injected conjunctiva, &c. Reaction† only gives the bounding pulse, the burning skin, &c.; but in the first stage of inflammatory Fever, or where there is determination to the centre, the skin is invariably cold and clammy, and pains are experienced all along the limbs.

In discussing these two leading questions, my readers will observe, that I have particularly alluded to the effect of evaporation on the skin as productive of cold, and to the peculiar state of the weather during the prevalence of Cholera. It will be necessary in elucidation to observe, that there is a material difference in the character of the cutaneous discharges. I must therefore call the attention of my readers to some physiological truths, to illustrate my assertions, that they may understand that the terms evaporation and transudation, as remarked by Mr. Edwards, are not synonymous with the insensible and sensible perspiration, respectively, of our older writers, because a part of what is removed by transpiration is first transuded and then evaporated. Evaporation may take place from the dead body, while transudation can only take place from the living body. Transpiration is, therefore, properly an operation of an intermediate kind, where the fluid is furnished by a vital function, and removed from the body by a

* See Thomson on Inflammation, 1813.

† I ought here to mention that there is no reaction in Cholera: when it takes place where stimulants have not been used, recovery is, humanly speaking, certain.

mere physical process. Haller believed that the matter of the sensible and insensible perspirations was essentially different; and it is important that my readers should understand this, as any power stopping the transpiration, must determine to the vital functions, especially when we consider the great quantity of matter which is formed by the vital functions, and removed by the physical process in a tropical climate. Lavoisier and Seguin estimate, that in Europe the average quantity carried off by the cutaneous transpiration in one person, in 24 hours, is 30 ounces; while that by respiration, including, as it appears, the pulmonary transpiration, is 15 ounces. In warm countries, the quantity is at least double. With this view of the importance of the due discharge by the skin being kept up, we shall more fully understand the danger of its being checked. That check, as before stated, is occasioned by a sudden blast of wind upon a skin covered with perspiration, which, evaporating with incredible rapidity, produces that extreme degree of cold which at once induces a collapse of the pores. The moisture on the surface, which was at first obstructed, is soon supplied by effusion. The suppression of the perspiration terminates in those effects which are known to be symptomatic of Cholera.

It is easy to explain how such intense cold can be produced so suddenly on the skin. The process of evaporation and absorption of heat, is exemplified in all its extraordinary effects in India; and in nothing more strikingly than in the phenomena of hail-storms in the hottest part of the year.

The wind lulls; clouds of water collect; and dark clouds rolling upon one another, appear in the horizon and threaten a violent storm, known in India by the name of north-wester; at length the dark silence of the heavens is succeeded by a sudden gust of hot wind from the south-west, which changes its direction on meeting the clouds, and blows from the north-west, producing such rapid evaporation that hailstones or masses of ice are instantly formed of the size of six or seven inches in circumference, and fall with destructive violence. Thus the wind from being hot and dry becomes suddenly cold and humid; by means of which, after the first rapid evaporation on the skin, large drops of sweat appear, producing a cold shivering, from the humidity rendering further absorption impracticable.

Having, I trust, satisfied my readers on the production of cold by rapid evaporation of perspiring fluid on the skin, and hence proved that cold skin is an exciting cause of that internal heat and congestion which denote the presence of Cholera, I shall now endeavour to prove that congestion in Cholera is inflammation, and that inflammation cannot exist without congestion.

Here I anticipate great objection, on the ground, that inflammation consists in an increased vital action of the heart and arteries, by which the blood is propelled with greater force than usual into the communicating lymphatic and colourless vessels; and that, consequently, we should observe a sensation of throbbing or increased action in the vessels about the heart, or in the carotids. I must acknowledge that, reasoning from analogy, these symptoms are to be expected; the contrary, however, appear in Cholera. There is not the least throbbing or increased action of the heart, or the arteries about the heart, but the very reverse of this; the vital action is considerably diminished, and no pulsation whatever is to be distinguished in the carotids, so feeble is arterial action. This unquestionably looks very much like asphyxia; and we have, apparently, no indication of the presence of inflammation. I can, however, adduce in support of my views the authority of Dr. Thomson, a practical writer, and one who stands high in professional repute. It is his opinion, that neither throbbing nor increased action in the vessels of the part affected is essential to inflammation; while redness, pain, heat, and swelling, are together with fulness of the præcordia. Accordingly in Cholera, post-mortem examinations exhibit the redness and an influx of unusual quantities of blood in the centre. "The local symptoms," these are this physician's own words, on this important diagnosis, "which seem essential to inflammation, are the four following; redness, pain, heat, and swelling. I have not included in this enumeration either the sensation of throbbing, or an increased action in the vessels of the part affected. The first is a symptom, which does not occur in every species of inflammation; and increased action of the vessels is rather inferred from other phenomena than actually perceived."

The position may be granted to this extent; but it may be alleged, as a strong proof of the absence of inflammation, that the pulse in Cholera is almost imperceptible. Though I acknowledge the

strength of this objection, I am far from deeming it insuperable. Let us refer to what Stahl, Gorter, Cullen, Vacca, Lubbock, and Thomson, all eminent authorities, have said on this subject. Stahl attributed a tonic, vital, or muscular action to the arteries, and Dr. Gorter has fully developed that blood-vessels themselves are endowed with this vital action, and capable of producing irregular distributions of blood independently of the heart. This fact has been fully illustrated by the experiments and observations of Hunter, and was one of the favourite speculations of Cullen. "The arteries are in fact," says Dr. Thomson, "capable of altering the distribution of the blood, and of propelling or transmitting more or less of that fluid, according as they are more or less influenced." This being allowed, the well known proposition drawn from analogy may be urged, viz. that whatever lessens the force of the action of the arteries, tends to diminish the local inflammation; and whatever increases the action of the heart and arteries, tends, in the same proportion, to augment the inflammation; so that, as in Cholera, the force of the heart and the arteries seem to be diminished, and therefore, while it may be congestion, it is not inflammation. Dr. Clutterbuck, treating of Epidemic Fever, comes to a contrary conclusion. He determines that interrupted circulation, in consequence of increased arterial action, often produces the oppressed state of the functions observed in violent Fever, with a diminution of energy throughout the whole system; from which it naturally follows, that instead of endeavouring to counteract depression by stimulant means, recourse should be had to the most active antiphlogistic measures*. Still more decisive of the question are the remarks of Vacca, who supposes the action of the inflamed vessels to be diminished, or to be proportionally less than that of the trunk or trunks from which they are derived. This author delivers his opinions in the form of distinct propositions, some of which may be here quoted.

"'Prop. 1st. Inflammation never takes place in any part of the human body, unless there be in that part a congestion of blood in very nearly the state of rest.' This proposition, Vacca conceives to be proved by the increase of bulk and redness of the

* See Clutterbuck on Epidemic Fever, p. 81 et seq.

small arteries, and by the increased flow of blood when an inflamed part is divided.

" 'Prop. 2nd. A congestion or semi-stagnation of blood cannot happen in any part of the body, without either an absolute or relative debility of that part.' In the healthy state, the resistance to distenation is equal to the impelling power, but when it becomes unequal, distension must necessarily take place. But a diminution of the resisting power can only arise from debility.

" 'Prop. 3rd. Any part of the body being in a state of debility, there will occur a congestion or semi-stagnation of blood, in the vessels not only of that part, but a part of the blood will be propelled into the lateral, lymphatic, and adipose or capillary vessels.' In the state of health the orifices of these vessels resist the entrance of the red blood into them with a vigour proportional to the impulse, but when this resistance is lessened or destroyed by debility, or a loss of tone, the blood enters, opens, and dilates them."

If the clinical practice of any one disease supports the hypothesis of Vacca, it is our clinical practice in Cholera.

Dr. Thomson, in his work on Inflammation, quotes a letter from Dr. Lubbock, who entertains opinions similar to those of Vacca, in which he observes: "A vessel, considered as a hollow muscle, can have its cavity enlarged, or its fibres elongated in every dimension, only by debility, direct or indirect; the effect of which is a diminution of tone or density, as a living solid, or a separation of the particles of matter composing it, to a certain extent. *This is the state of the irritable fibre in inflammation of the vessels in which from the loss of density or greater elongation of their fibres, their cavities are increased, more blood is received into them, and their action is more feeble.*" What is this, I may inquire, but congestion, and instead of increased velocity, diminished action of the vessels? "The arguments," "continues Dr. L. which I made use of, in my paper on the increment of the body, will apply with little variation to a state of Inflammation; for, strictly speaking, a state of Inflammation is merely a growth of the vessels of the part so affected. If, therefore, the general increment is affected by a diminished excitement, a partial increment of the vessels will be the same. But if a vessel

has its diameter enlarged by a state of atony, or diminished contractile power, it follows not only thence, that the motion of the blood should be retarded, but also from the established hydraulic principle, that fluids always move with less velocity in passing from tubes with a small diameter to a larger*." "If this view (Dr. Thomson concludes) of the state of the circulation in inflamed vessels be just, it will follow, that inflammation is sometimes attended by an increased, and at others, by a diminished velocity in the circulation through the capillary vessels."

It may be objected, that in inflammation, there is always an inflammatory crust or buffy coat on the blood, which is never exhibited in Cholera. A reply to this will be furnished by Thomson, who says: "The buffy coat has not generally been found on blood at the first attack of inflammation. I have repeatedly observed in bleeding patients affected with pleuritic complaints, that at the same bleeding, the blood first drawn had little or none of the buffy coat, while that which was last drawn, was completely covered with it." This is quite satisfactory, since the inflammation in Cholera is always incipient.

It may be further urged, that the blood discovered in the distended vessels in Cholera is dark, which would not be the case if inflammation existed; for it is actually found in this disease of a purplish or bluish hue, whereas, in Inflammation it is red. But I repeat in this place, that in Inflammation, the blood in post-mortem examination, is often dark; having more or less the colour of venous blood. Dr. Thomson corroborates this opinion. "The kind of redness," says the Dr. "in some inflammations resembles that of arterial blood, in others it is dark; and in others, it is of a purplish or bluish hue, having more or less the colour of venous blood." This physician very properly urges on the minds of his readers the following remarks, to which I solicit the particular attention of my readers. "The utility of attending to these differences in the shade of colour in inflammation will appear, when we come to consider the marks by which the different species of inflammation are distinguished from each other." Need I add how deeply it is to be lamented, that greater regard had not

* Thomson on Inflammation.

been paid, in India, to these practical facts than to those delusive theories of abstraction of oxygen, &c.

If any importance be attached to the circumstance that after death, in many dissections, no signs of incipient inflammation appeared, or redness of the parts; I would remark, that the absence of redness in the parts is no proof that inflammation did not exist, for redness of the part frequently disappears after death. In this opinion I am supported by Dr. Thomson. He observes, "the redness of parts which have been slightly inflamed, not unfrequently disappears after death; so that it is difficult to discover the precise spot, which during life, has been the seat of inflammation." Again it may be supposed, that if inflammation existed to the extent I have mentioned, it would not remain in the centre, but extend to the surrounding parts. But the same high authority shews, that such extension does not take place. "Inflammation," says Dr. Thomson, "can be excited on the surface of the chest, by the application of a blister, the heat of the inflamed part will seldom exceed that of the surrounding parts, more than one or two degrees." This physician adds, "I have repeatedly had occasion to observe, in inflammation of the joints, whether rheumatic, venerial, scrophulous, or acute, and arising from external injury; that the skin covering them remained hot and dry, while the rest of the body was covered with a perspiration."

Thus, then, I trust I have, as briefly as possible, satisfied my readers on these important points, viz. that congestion in Cholera is inflammation; that inflammation may exist in the centre, with diminished action of the heart, and arteries; and that in congestive inflammation the blood is of a dark, purplish, and bluish hue.

Having, I trust, sufficiently established the correctness of my opinion on the proximate cause of the disease when Epidemic, it will be necessary to notice those circumstances which induce occasional attacks of the disease; that is to say, when it occasionally appears affecting individuals, but is not universally prevalent. The proximate cause here is inflammation, induced from superabundance of acid (not bile) in the first passages. Dr. Cullen allows, that all vegetable aliment first turns acid in the stomach; for every stomach, human or brute, is always, on examination, found to have an acid present in it. Therefore, a proper degree

of acescency contributes to health. A morbid state is when the aliment enters into a high vinous fermentation, with a copious generation of fixed air, of the same nature as that produced in the ordinary vinous process. It then becomes a disease *sui generis*, and has the power of destroying the mobility and contractility of the moving fibres, and even the tone of the stomach itself, producing flatulency, spasm, vomiting, and purging. Sir John Pringle has shown that the admixture of animal fluids cannot hinder the acetous process, but on the contrary, in certain proportions, promotes it. In a climate like that of India, much disease is engendered in the first passages, by obstruction; and herein lies all the diseases of the old resident in a tropical climate, for many are the circumstances which induce superabundance of acid. Excessive heat produces the obstructed bowels at the termination of a protracted hot season, therefore torpor in the action of the liver, is a consequence; hence biliary secretion is deficient, for the principal office of the bile is to neutralize superabundance of acid in the stomach; any circumstance therefore, which induces an excess of the latter, proves a deficiency of the former. The symptoms of superabundance of acid are a sensation of burning in the stomach, pain in the bowels at first, with spasms and inflammation; from the acrid nature of the acid, vomiting and watery purging; and in fine all the symptoms of Cholera are rapidly exhibited.

SECTION XI.

TREATMENT OF CHOLERA.

The indications of cure, are, first, to allay the irritability and spasm, and prevent inflammation. Second, to excite biliary effusion into the bowels, and alvine dejections of a healthy consistence. Third, to determine blood to the surface. Fourth, to restore the system to its former tone and healthy action. The first indication is accomplished by bleeding, sedatives, and anti-acids. The second, by calomel and drastic purgatives. The third, by counter-irritants. And the fourth, by corroborants.

First, bleeding. This may be effected by the lancet, by leeches, or by cupping. The most successful is by the lancet; but we find that it is not always practicable; either syncope comes on, or otherwise congestion has taken place, which prevents the flow of blood from the arm or the jugular vein; in either case, we should have recourse without delay to leeches, which ought to be applied over the epigastrium. They are not, however, at all times and in all places to be procured, to the number required. When this is the case, cupping supplies the desideratum.

The extraction of blood from a large vessel, at a distance from the inflamed part, will be more beneficial than topical bleeding. Clinical practice shews, that the patient's safety absolutely depends upon an immediate stop being put to the first approach of inflammation and congestion; and that topical bleeding only proves powerfully efficacious when general plethora or congestion has been previously removed. We shall find, therefore, according to the urgency and importance of the case, that venesection, or arteriotomy will not only be once, but repeatedly necessary, in conjunction with leeches and cupping. The quantity of blood to be taken away must depend, in like manner, upon the severity and urgency of the symptoms, the strength, and age of the patient. We must ever consider, however, that in the majority

of cases, especially among Europeans, cure depends upon the boldest use of the lancet. In the records to be found in the second part of this work, instances are stated in which life seems to have been saved by the sacrifice of some hundred ounces of blood in a few days; and that 60 ounces were drawn at a time, with unequivocal success, in which the small extractions would have failed to render the least relief.

Our object, in this disease, is obviously to evacuate a considerable quantity of blood; hence we must operate in such a manner as not to induce fainting. Now we know from experience, that during the operation of evacuating blood, the patient is liable to fall into a state of syncope; a horizontal position, therefore, is to be preferred to any other; for fainting is not so liable to occur in a horizontal as in an erect posture. But admitting that in any position fainting occurs, we should not on that account suppose the blood will not again flow, we must wait patiently, at the same time moving the arm in all the variety of positions that can probably assist in bringing the openings of the skin and other integuments to correspond with that of the vein, until the blood begins to flow. Throwing the muscles of the part into constant action, or giving the patient a cane or other firm substance to turn frequently around in the hand, will often produce a flow of blood which would not otherwise ensue. The experienced practitioner knows these circumstances to be true; but as the tyro, ignorant of such facts, might not adopt these alternatives, I have thought it proper to be thus particular.

With respect to arteriotomy, we are aware that its most strenuous friends have shrunk from any attempt of this kind on the larger arteries. Perhaps in no affection is arteriotomy in the smaller branches more desirable than in Epidemic Cholera, in which we require immediate and large evacuations of blood. But let us now suppose that we fail to obtain blood by venesection, arteriotomy, and cupping; we must then have recourse to such measures as will draw the blood to the surface, such as friction and the hot bath. It often happens, that we can draw blood while the patient is in the hot bath, which would fail to flow in any other situation. The bath must therefore be at hand.

Sedatives are laudanum, calomel, magnesia, and hot bath.

Laudanum. This medicine may be given in doses of sixty to eighty and one hundred and fifty drops with great safety, and the effect is favourable in producing sound sleep, assuaging pain, removing spasm and irritability. But laudanum in less doses operates in a different way; fifteen and twenty to thirty and forty drops produce a high degree of excitement, sometimes apparent inebriety and delirium, and if the patient should doze, frightful dreams awake him in convulsive startings.

Calomel, in doses of from fifteen to twenty grains, is a sedative, and has the singular good qualities of immediately stopping violent vomiting and purging, removing spasmodic irritability, producing tranquillity of mind, exciting the secretion of the liver, and preventing the progress of inflammation. I have known a patient labouring under frequent dysenteric evacuations, with tenesmus, to be under the common course of small doses of calomel and opium for a fortnight without effect, and strange to say, one dose of twenty grains of calomel, at once stopped the purging, removed the tenesmus, and soon restored the bowels to their former tone. Calomel, in doses of from one to five and ten grains, acts as a stimulant, produces vomiting, and violent purging, lassitude, restlessness, and almost insupportable griping pains of the abdomen. Although such are the effects of calomel on the constitution, it is equally important to mention the form in which calomel ought to be given in acute diseases.

Pills are generally considered to be the most convenient form, and are therefore adopted in common practice. But I have known pills to have passed through the system in the same form in which they were taken into the stomach; this point I have always considered important to bear in recollection. I have invariably therefore made it a rule to give the calomel in powder. Its immediate operation is insured, which is a most material point, particularly in Fevers and Dysentery; but much more so in this disease, by which a patient is carried off in from four to twelve, and at farthest thirty hours. If this point therefore be overlooked, the chief object, the speedy operation of this invaluable medicine, may be frustrated, and the patient lost. On the same grounds I am of opinion that laudanum is preferable to opium; the former, it must appear evident, is more directly active in its operation, whilst the

latter has to undergo the proccss of dissolving, or perhaps, not dissolving, passed in the same manner as pills, without any effect whatever. I am perfectly convinced of what I now assert, and look back to the day on which I discovered this error in practice, as a great improvemcnt in the treatment of acute diseases; and I presume to recommend it strongly to the consideration of my medical colleagues.

Somc astonishment may be excited at my placing magnesia on the list of sedatives; but I apply thc term in its proper sense, from its power of assuaging. I ascribe the cause of occasional and local Cholera to exccss of acid in the first passages; any medicine, therefore, which has the effect of assuaging violent spasm, and allaying irritability, is unquestionably a sedative. Acid in excess is productive of spasm, purging, and vomiting; and this is removed by the neutralizing power of magnesia. I know no medicine in therapeutics which has been less understood in its medicinal operation than magnesia; and our ignorance of its remedial properties is ascribable to our ignorance of the dose in which it ought to be administered. From half a drachm to a drachm was deemed sufficient by most clinical practitioners, which, howcver, is not sufficient to neutralize even a small quantity of acid; no effect, therefore, ensued, and the prescriber coneluded that there was no acid in the stomach; whereas, if the dose (I am speaking of adults) had been increased from three to four drachms, not only would the acid have been destroyed, but the spasm, vomiting, and thirst, would instantly have ceased, and copious substantial alvinc dejections have been effected. In tropical climates, excess of acid in the primæ viæ is the source of a variety of constitutional derangements, exhibited in bowel and stomaeh affections, producing ulccrations in thc throat and eruptions on the skin.

The 2nd intention of cure is fulfillcd by purgativcs. They must possess that quality, which evacuates fæculent matter, so that thcy are opposed to salts of every description, which evacuate watery fluid only. The purgativcs we desideratc arc those which evacuate quickly. Wc know, however, that salts, such as natron vitriol. and magnes. sulph. alonc, have this effcct, whilc jalap, castor oil, and aloes, arc slow in their operation. By combination, the desideratum is supplicd, viz. by purgatives which effect

fæculent discharges. We therefore combine natron vitriol, with aloes, or potass supertart. with jalap.

I call upon the young practitioner to consider the chemical and pharmaceutical rules in the composition of their formulæ; inattention to which has been the principal source of failure in the treatment of this disease. Various medicinal ingredients, it is proper to remark, will more readily combine with some than with others, in producing the same effect. Thus for instance, the combination of calomel and jalap would be suitable, as they co-operate in producing the same result; but were we, on the other hand, to combine calomel with potash, although they are both purgatives, yet they would invalidate each other, or the calomel would become quite inert while the potash retained its activity. The operation of two substances united may be very different from their effect when uncombined: the compound may partake of some but not of all the properties of the components; or the ingredients may acquire perfectly new qualities from their combination. From this consideration will appear the necessity of exhibiting only such substances as have a tendency to co-operate in producing the same effect, instead of acting incongruously, or destroying the efficacy of each other. And if the principle of prescribing, at the same time, such substances only as are compatible with each other, had been more generally studied, I am satisfied that large doses of calomel and laudanum, which are sedatives, would not have been combined with stimulants, in such numerous instances as they erroneously have been, in the treatment of Epidemic Cholera.

We now come to the 3rd indication or counter-irritation. The use of friction with stimulating tinctures, and of acrid embrocations, composed of garlic, capsicum, &c. have been occasionally resorted to; but their stimulating effects would appear to be counterbalanced by those of evaporation. As a means of general excitement, sinapisms have been used ; but not perhaps so frequently or extensively as their usefulness in some instances would warrant. In particuliar, sinapisms do not appear to have been resorted to, as one of the early means of cure; so that when they have taken effect on the skin, their action on the system has been too often obstructed by the progress made

by the disease ; or, the skin itself has become insensible to their operation. Sinapisms, largely applied to the surface, and in proper time, hold out the prospect of a considerable and permanent excitement, and their early application is recommended to the serious notice of medical practitioners. With similar views, and as topical counter-irritants, vesicatories, composed of cantharides plaster ; or that plaster with the addition of the oil of turpentine ; mineral acids, and boiling water have been pretty extensively employed.

The state of the skin, however, especially when the disease is advanced, is very frequently such as to render the action of vesicatories extremely uncertain ; even the strongest mineral acids frequently fail in producing any lively impression : in these desperate states, boiling water has been had recourse to, and with effect, for there is no readier, or more powerful vesicatory. The application of the various remedies of that nature to the skin, especially over the regions of the heart, the stomach, or the intestines, has been found to be of manifest utility, if employed while the skin is susceptible of their action. There appears sufficient evidence in many cases of their immediately rousing the sinking powers of life, when every other remedy had failed.

My able friend, Mr. John Tytler*, desirous of establishing it as an axiom in physiology, " that there are some diseases which cannot take place in the same constitution together," on the principle that pregnancy is incompatible with phthisis, tetanus with intoxication, hæmorrhage after labour with catarrh, and lastly mercurial irritation with syphilis and hepatitis, inquires why mercurial irritation should not also be incompatible with Cholera Morbus, so that if the one be artificially excited, the other must spontaneously cease. Mr. Tytler, believing that the mere mechanical action of rubbing with a soft unctuous texture, long continued, tends much to allay nervous irritation and overcome spasm ; and aware of the fallacy of theory, he has given a detail of cases in support of his opinion. I am inclined to coincide in opinion with Mr. T. especially in the truth of the well-known fact, that by rubbing in, all irritation to the stomach is avoided ; so that that organ can be allowed to remain tranquil, while we are

* Tytler on Mercurial Friction, Med. Phys. Trans. 1832.

at the same time producing considerable effect on biliary secretion as an auxiliary; and for useful friction, I know nothing better than mercurial ointment.

Our counter-irritants are: 1st, the Spirituous Vapour-bath.

Prepare a small rattan-bottomed couch, or hospital cot, the frame of which should be raised at least thirty inches from the floor; it should have a flounce or valance, made of thick woollen or cotton materials, fastened to the frame all round, and trailing about three inches on the floor: prepare also two brass basins, each about ten inches in diameter, and four inches in depth. Likewise two brass evaporating cups, each about six inches in diameter, and two in depth. These cups should have three small pegs or feet to support them, about an inch and a half above the plane they stand upon. When the vapour-bath is to be used, a small blanket or quilt must be spread upon the couch; it should reach a little way over the ends and sides; a larger blanket or quilt must be in readiness to cover the patient. Half a pint of any strong spirit is to be put into each of the basins. Two ounces of vinegar, mixed with two drachms of camphor dissolved in rectified spirits, and, in some cases, a scruple of opium, are to be put into each of the evaporating cups. The basins, with the evaporating cups put into them, are then to be placed under the couch, one at each end. The patient being laid on the couch, and covered with the large blanket or quilt, the spirits are to be ignited. The heat presently becomes great. Two basins used at once, will cause a heat equal to 126°; one basin will cause a heat equal to 113°. Few patients can bear the former; and almost all complain much, even of the latter degree of heat. Half a pint of good spirit will continue to burn for about seven or eight minutes; during this time the vinegar in the cup boils, and is about half wasted by evaporation. Two basins, therefore, used in succession, will burn for 15 minutes, and produce every desirable degree of heat. The utility of the evaporating cup has been questioned. If camphor be dissolved in the spirit to be ignited, the combustion is a little retarded, and it forms a useful addition to prevent pilfering. There is hardly any sensible smell of camphor, whether it be used in the boiling vinegar, or in the ignited spirit.

It is obvious, that this mode of administering heat, however inapplicable to most cases of Cholera, may yet, in some inflammatory and spasmodic diseases, be a very valuable remedy.

No. 2.—Hot-water Blister.

The easiest method of using hot-water either as a vesicatory or merely as a rubefacient is this. Have ready a square pad of flannel, which has pretty long tapes sewed to it, and crossed so as to bring one end out at each corner of the pad; the pad should consist of six folds of flannel, and should be about five inches square. The water being ready at the bed-side of the patient, either at the boiling point, or at such lessened temperature as may be previously determined upon, the flannel pad is to be dipped into it. The operator, holding the pad by the tapes, should give it a smart shake on withdrawing it from the water, and apply it immediately to the skin. By shaking out all the superfluous water, in applying it, the patient is saved from any scalding which might otherwise be occasioned by its dribbling down from the pad. If the water be used at boiling heat, a momentary application of the pad will in general be sufficient to cause vesication. This point, however, must be regulated by the judgment of the practitioner, according to the state of the patient's skin.

No. 3.—Nitric Acid Blister.

The term blister has been improperly used in this instance, as the acid does not vesicate the part to which it is applied; but acts on the skin like a cautery. If the acid be of the specific gravity of 300, and if the skin of the patient retains its vitality in any considerable degree, a mixture of two parts of acid, and one part of water will generally be found of sufficient strength. The acid, thus diluted, is to be applied to the skin by means of a feather. If the skin becomes immediately discoloured, (in Europeans it will assume a straw colour,) and if the pain produced be sharp and burning, the application may be considered as having succeeded, and the part should immediately be sponged with tepid water; or the acid may be previously neutralised by the application of an alkaline solution. When we find that neither discoloration nor pain follows the application, the acid is to be used without dilution. The sulphuric acid may be also used, especially when we find the nitric acid fail.

With the hot-water and acid at our command, the actual cautery, burning moxa, or lint or eotton steeped in oil of turpentine and ignited, although powerful rcmedies, may probably be safely dispensed with.

No. 4. Sinapism.

Powdered Mustard Seed, half a pound.
Ditto Capsicum.
Ditto Ginger, of each one drachm, make into a Cataplasm, with Vinegar, to which add two ounccs of Oil of Turpentine.

No. 5. Liniment.

Tincture of Cantharides, two drachms.
Camphor, three drachms.
Soap Liniment with opium, four ounces: mix.

No. 6. Liniment.

Powdered Mustard Seed, two drachms.
Oil of Turpentine, an ounce and a half.
Olive Oil, half an ounce: mix.

Among the most powerful, suecessful, and indispensible external applieations for the purpose of restoring action and sensation, we may reekon Sinapism, whieh is at the same time among the most powerful rubefaeients that we can employ.

Having thus minutely described the remedies and their qualities, I now come to their applieation. Believing, as I do, the most material part of the cffect of the disease to be ineipient inflammation, it necessarily follows, that the first remedy to be adopted, is blood-letting; indeed, it is the most important, but at the same time, one that requires many limitations in its use, as in all other inflammations. The restrictions and limitations with regard to this praetiee must be determined by the eharacter and habit of the individual. The native of India is not of the same plethoric and inflammatory habit as the European, and does not require the same quantity of depletion; but both are suffering from an oppressed state of the arterial and venous system, in the bowels, stomaeh, and brain, and consequently both must submit to large abstractions, in order that those vital viscera may be relieved; or in other words there is a general depression of the powers of the system, the result of the oppressed state of the important organs alluded to. Blood-letting and other analogous means, by restoring circulation, set these organs free, and hence is energy restored to

the system. On a healthy and middling aged European being attacked, if 60 ounces of blood can be obtained, abstract that quantity; and should a recurrence of urgent symptoms appear, we are not to be deterred from further abstractions. Spasms and burning heat at the præcordia are alone subdued by this potent remedy; and until they cease and the pulse returns to the wrist, we must not cease to be energetic in our measures. Simultaneous with this depletion, we are to put upon the tongue twenty grains of calomel; and if the thirst is very urgent, as well as the burning heat of the stomach, four drachms of magnesia are to be administered in a convenient vehicle; rice and barley water are the best liquids to pour down the powders with. Let the following draught be given:

Tinct. Opii. gtt. 100.
Water ℥i.

As often as these remedies are rejected, so often are they to be repeated. An injection may be thrown up the intestines, without delay, consisting of

Ol. Ricini ℥ iss.
Water lb. ss.

This may be repeated every two or three hours. Subsequent to the administration of the calomel and draught, give

Jalap. ʒ iss.
Potass. supertart. ʒss.
Water ℥i.

To be repeated every four hours, until it operates.

On the instant of attack, let sinapisms be applied to the soles of the feet and to the hands; a large blister is to be applied over the epigastrium and abdominal regions. The thirst is to be appeased with rice or barley water, abounding with table salt; if the thirst continues, give lime water, (aq. calcis.) The repetition of the bleeding, the calomel, the draught, and the purgatives, as well as the extent of the former and the doses of the three latter, must depend on circumstances, and can only be determined according to the judgment of the practitioner.

It has been customary to use at this period the hot-bath. I cannot say, that I have seen much benefit derived from its use; the fatigue of immersion, the chance of a check on coming out, and the time and trouble that ensues in its adoption, combine to

induce other alternatives to excite to the surface. I prefer what is called shampooing, or the action of pressing by the palms of the hand the muscles of the legs and arms.

Caution must be used not to disturb the patient from his bed during the administration of remedies, as one of our first objects must be to procure sleep. If there is such a thing as a crisis in disease, sleep is that in Epidemic Cholera. The immediate cause of sleep consists in the suspension of volition ; it follows, therefore, that whatever diminishes the general quantity of the irritable principle, or diverts it from the faculty of volition, must be curative ; spasm from muscular action is appeased, and a general diminution of a quantity of the irritable principle is the consequence. This effect excites to healthy arterial circulation, and increases the action of the absorbents ; the natural heat of the system returns to the surface ; and the extremities which were previously cold now become warm ; a gentle warm diaphoresis is soon observed upon the cuticle, and it is not unusual for a patient to awake from sound sleep perfectly well. If such is the result of sleep, it is evident, that our principal object is to promote it. While, therefore we are applying counter-irritants, we must be careful not to prevent this repairing, refreshing effect upon a fatigued, wasted, animal frame. The greatest discrimination hence is desiderated to know when to commence and when to cease in the adoption of counter-irritants. Laudanum must be given in large doses ; four hundred drops have been known to be taken in a dose, and, by its quantity, to cure without any other adjunctive. In fact, the second part of this work exhibits treatment so fully illustrative of this principle, and confirmatory of what has been said, that laudanum alone has by its sedative powers, been one of the most successful remedies which has been adopted ; and how well this incontestable fact alone proves that the system of employing stimulants, which adds to accumulated irritability, is injudicious ! My readers will naturally observe, that the adoption of such active counter-irritants, which I have mentioned, may prevent the object I have been so desirous of obtaining by the irritation and pain they would necessarily occasion. But when the body is in that state of collapse, from the disease having gained strength by neglect of proper remedies, it must be at once evident our counter-

irritants must be such as may by graduated application produce effect; for when patients neglect reporting themselves immediately on the attack, the surface is soon bereft of sense and motion. The general principal is, (especially when the disease is met on the instant of accession,) to excite the surface by a gentle degree of warmth; but I would not have it suddenly applied either by violent stimulating applications, or the more powerful application of the hot-water blister. The principle to be kept in view is the nice adjustment of the natural and artificial external stimuli to the exact tone of the surface. It is an established fact, that when through exposure to extreme cold, the fingers, or other external parts of the human body are frozen, and the heat of these parts is reduced to the lowest point consistent with life; if artificial heat be suddenly applied, a mortification ensues, and those parts which have been first bitten, drop off. But if they be thawed by friction with snow, and afterwards the gentlest warmth gradually applied, the parts are soon restored to their wonted use and activity. Hence the degree of heat is to be regulated by that steady unerring hand which is governed by the strict rules of science, under the guidance of experience and reason. To excite to the surface, and at the same time to promote sleep, may be concluded therefore, to be a general rule; and that violent friction is not only unnecessary, but by preventing sleep, may prove hurtful. The friction should be moderate, beginning at the upper and lower extremities, where the circulation is always the most lingering, proceeding gradually to the thighs, abdomen and chest. Friction may be performed in the best manner by the hand alone, the natural warmth of which will be communicated to the body, and gradually increased by the continued attrition. Next to friction with the hand, the rubbing with a flesh brush may occasionally be had recourse to, or what may prove still more advantageous skins of hares, or warm flannel may be well impregnated with the penetrating fumes of gum benzoin, kept in readiness in a state of fusion. By its stimulating and gently bracing quality, this gum is admirably adapted to the present purpose; and its pleasant odour will be grateful to those who are attending a crowded hospital. Thus then by stimulating the cutaneous nerves, avoiding rude and unscientific applications, we shall find that the principal internal

organs will soon sympathize with the surface. The arteries will be excited to propel the blood into the corresponding veins, and animal heat will again be circulated to the extremities and the skin.

I conclude then, that under this management and treatment, sleep has been obtained, the patient awakes nearly recovered, the vomiting and the purging have ceased, the spasm resolved, the arterial action roused, the emunctories of the skin excited, a general warmth diffused over the surface, with a countenance, which appeared melancholy, dejected, and worn down, enlivened with returning cheerfulness and health. Our object gained, the next indication of cure is to keep up the restored secretory action, to guard against inflammation from reaction, and to prevent return of the spasm, and all check upon the surface. Such indications oppose the use of stimulants, but suggest the adoption of purgatives and alternate doses of calomel. The dejections after a confirmed attack of Cholera become not only insufferably offensive, but are actually ink black in many cases; the tongue is loaded and foul; and other symptoms attend to mark that the constitution must be well purged to be effectually cured. The indications are then, occasional doses of from ten to fifteen grains of calomel, followed up by drachm doses of compound powder of jalap. As the bowels and stomach are cleansed, so will the strength of the constitution return, and with strength all its attendants, appetite, energy, and cheerfulness. As lassitude, loss of apetite, pain, depression, inaptitude to motion, are the effects of loaded and foul chylopœtic viscera, so are the reverse of these symptoms produced as the obstruction passes away. The unscientific and rude, reasoning only from analogy, concluded that purgation debilitated under all circumstances and in every state: those remedies were prescribed, which had an opposite tendency, whether they were in cases of Fever, or corrupt dysenteric accumulation. Experience, however, teaches, that purgation in both can alone strengthen and cure; for what is curative is strengthening, the former to a demonstration is purgation, the latter a mere result.

When the bowels are well cleansed, which we shall know by the above discharges becoming well mixed with bile, and the tongue clean, we may desist, and have recourse to the fourth

indication—tonics, in any shape we choose; the best is as follows:

Tinct. Gentian ℥ i.
Spir. Lavend. ℥ iss.
Infus. Gent. ℥iss.—One wine glass once or twice a day.

Such, then, is the treatment of Epidemic Cholera in a patient who complains on or soon after the attack; and which has been found to be invariably successful.

I should mention in this place, that great success has attended the use of the following pill, in the treatment of natives, who are not of plethoric habits.

R. Piper. Nig.
Opii
G. Asafœtid. aa. gr. ij. biat. pil.

Col. Galloway*, by whom this prescription was communicated to me, recommends that the pill should be masticated by the patient, and then swallowed: the medicine would, however, operate equally well were it administered in the form of a powder.

The following remarks respecting this prescription are from the pen of that gentleman. "Having been, for many years past, at the head of a large establishment, more than usually exposed; and being at a distance from medical assistance, with several populous villages in our neighbourhood, the inhabitants of which, for want of better aid, in all their ailments generally applied to me, I have had an opportunity of seeing very many cases of Cholera. I had tried almost every remedy that came to my knowledge, but without any satisfactory result. I remembered to have met with a prescription for Cholera, many years ago, in an Arabic book on medicine; but as that was before the disease broke out as an Epidemic in India, I did not accurately recollect the ingredients, nor could I at the time find the memorandum I had made of them, I thought, however, they were the above, and I determined to try them."

At the request of Colonel Galloway, this recipe was officially made known, in 1828, to the Thannadars throughout the Bengal Presidency, for general information; and he has himself been enabled to communicate a knowledge of its virtues extensively, through the medium of respectable natives. The reports he

* Of the Bengal Army.

received from various quarters respecting its operation are very favourable. Its ingredients, besides being acceptable to all classes of people, are procurable, by the poorest individuals, in every part of the country.

The medicine, it may be remarked, acts as a sedative, the black pepper operating as oil of peppermint in expelling wind, while the large dose of opium and asafœtida counteracts its action as a stimulant.

I conclude my observations on the treatment of Cholera with some remarks which deserve the attention of the practitioner.

One of the most urgent symptoms of this disease is thirst, and so much so, that patients will sacrifice their lives for a drink of cold water. It is therefore necessary to bear in mind the extreme danger of allowing them to have their wishes. The sense of burning heat in the bowels and stomach, and a high degree of thirst, cause them to solicit with much earnestness for a cold draught, in anticipation of relief; but it is a feeling of much insidiousness. The greater quantity they drink, the more urgent are their entreaties and anxiety; and the indulgence of this desire produces greater distention of the stomach, and the most lamentable and incessant retching. Immediate death has resulted in the very act of drinking cold water. I observed many unfortunate victims to this error, who had died beside small pools of water.

In like manner, I must urge the necessity of keeping from patients in this disease those sights and circumstances which excite alarm and depression. It is astonishing how much mental irritability may be removed by cheerful conversation, and what despondency of mind will be excited by the intrusion of idle visitors who may imprudently mention the number of deaths caused by the disease. Even a mind of the greatest fortitude will be impressed with the utmost terror and distress, if allowed to remain among other patients who are suffering under all the agonizing horrors of the first attack. There should always be one ward for immediate admissions, and another for convalescents, to prevent such mental excitements.

SECTION XII.

PREVENTION OF CHOLERA.

The best means of preventing the accessions of this awful disease now remain to be suggested. It will be necessary first to indicate the sources from whence the disease may be derived, the consideration of which will show generally the nature of the means of prevention to be employed, as well as the necessity of having recourse to them.

The sudden alternations of cold and heat may be reckoned as one of the chief sources from which the disease originates. The exposure to the cold dews of the night, in a hot climate, prepares the system for the stimulating effects of the heat of the succeeding day; the body being much more liable to be affected by the heat after the application of cold. The effects of this alternation must vary with the intensity of the previous cold and the subsequent heat, so that there may be various gradations between a transitory glow and a fatal inflammation. The proof of this may be witnessed in the sharp pain felt on holding a chilled hand to the fire; no less than in the method used in northern climates of restoring a frozen limb, not by the immediate application of heat, which would produce a violent inflammation, speedily terminating in mortification, but by rubbing the part with snow, and gradually exposing it to warmth.

The gradual alterations of the weather, from cold to heat, enable the system to accomodate itself to those changes which they produce; an abrupt transition cannot, however, take place without inconvenience to the constitution. We perceive the effect of a violent change on the frames of those who, coming from the cold climate of England, are suddenly exposed to an uncommon degree of heat on their arrival in India. Their circulation becomes quicker; their perspiration freer; their pulse harder, fuller, and stronger; the skin is redder than usual, especially in the face; a lassitude or debility ensues from the increased vascular action;

and more or less of fever is kept up, until the constitution becomes accommodated to the climate.

Transition from heat to cold has not been observed to produce the same evil effects. The heated Laplander rolls in the snow and even drinks the cold snow water with impunity. The Russian too safely passes from a vapour bath to one intensely cold. Various experiments of a similar kind have been performed without injury or inconvenience; and hence it may be assumed that, within certain limits, the transition from a higher to a lower temperature is attended with no danger. The circumstances, however, are different when we go with a cold skin into a bath of a lower temperature, or when perspiration is suddenly checked by a cold breeze blowing on the surface; the effect in such cases would be collapse and determination to the centre*.

Since, then, the system is prepared by cold for the reception of inflammatory diseases, it is obviously necessary to keep quiet and cool for some time after being exposed to wet, or that chilly humid atmosphere which occurs in the hot season, avoiding carefully a sudden transition to a higher temperature, and likewise abstaining from those stimulants, such as brandy, which are resorted to for relieving, but which only serve to aggravate the disorder. The use of flannel next to the skin is very desirable, it being an excellent preventive against the effects of sudden vicissitudes of the weather.

Next to these variations of heat and cold, noxious exhalations require to be guarded against as powerful agents in the production of the disease. It is impossible to say with precision how diseased action ensues by the effects of miasmata on the system. On this point, Dr. Harrison remarks, that there are four surfaces on which they can impinge and produce their impression; viz. the stomach, through the œsophagus; the skin, either by absorption or nervous excitation; the Schneiderian membrane; and the mucous tissue of the bronchiæ. Well-accredited facts demonstrate that the mucous tissue of the pulmonary organs receives and imparts an irritative sympathetic impulse to the stomach, and thence to the other abdominal viscera, the brain, &c. Professor Silliman on inhaling, for a day or two, arsenious vapours, became feverish, lost his sleep,

* See Sec. X. on Proximate Cause.

had his chylopœtic viscera deranged, and his stomach entirely disordered. Mercurial vapours will readily induce salivation when they are inhaled. From the inhalation of nitrous oxide, the nose being compressed with the fingers, it is contended that miasmata influence the system only by impinging on that part of the mucous tissue which lines the fauces, trachea, and bronchiæ. A number of experiments is, however, brought forward by Dr. Rousseau, to prove that the Schneiderian membrane is principally affected by exhalations. He observes, that the symptoms generally attributed to the admission of deleterious effluvia into the stomach, are exclusively the result of their action upon the membrane of the nostrils, and that the stomach is only secondarily affected, though it is impossible to explain the mode of affection. It is from the admission of this doctrine that veils have been recommended as a precautionary means, in situations where there is reason to fear the existence of malaria.

Without ascribing too much influence to malaria as a cause of Cholera, and without determining the particular manner in which we are liable to be affected by that agent, I shall mention those means which appear to me capable of preventing the formation of noxious exhalations. Care should be taken to prohibit the excavation of ponds, which are ordinarily filled with vegetable matter and large quantities of animal excrement. The ground must not be loosened in a manner to admit large quantities of water, which, being retained among particles of partially decayed vegetable substances, assist in producing infectious emissions. The natural water courses must not be obstructed. Muddy drains which, after heavy falls of rain, receive copious additions of filth, must be prevented. The cellars which exist in many parts of cities and towns must not be allowed to retain water and quantities of putrescent matter. In filling up the streets and alleys, care must be observed that the back parts of the houses are not thereby rendered lower than the adjacent ground; as, having no drains, they admit of large accumulations of kitchen offal and other offensive matter. The streets and drains ought to be paved and covered in, for where this is not the case, after very considerable rain, mud accumulates several inches in depth, which, being mixed with the excrements of herds of horses and cattle, occasion an emission of the most offensive effluvia.

Privies must be so situated that they do not receive water; and care must be bestowed with regard to cleanliness, that they do not become fœtid. And let fixed lime and powdered charcoal be sprinkled along drains, and thrown in wells, and over swamps, and amidst the offal of market places. Finally, the burying ground must be so located as not to be in any populous part of the city.

Some general rules, the observance of which is indispensable on the prevalence of the Epidemic in any part of the world, must be here laid down by way of conclusion.

First. Since it has been demonstrated, that the Cholera is not contagious, but that fear is an exciting cause, the influence of that passion must be guarded against, by the most public declarations on the part of Government respecting the non-contagious nature of the disease; lest neglect of the sick, and their accumulation in particular spots induce in themselves a predisposing as well as an exciting cause.

Secondly. It would be desirable to provide good clothing, lodging, and wholesome nutritious food, for those who are naked, houseless, and destitute, or from poverty badly fed, clothed, or housed.

Thirdly. It will be necessary to provide shelter for those who are exposed to the sun, such as the people in dock-yards and boats, travellers, &c.

Fourthly. Temperance, both in eating and drinking, and in the ordinary manner of living, should be inculcated.

Fifthly. Exposure to the cold night-dews and sudden atmospheric changes must be guarded against.

Sixthly. The use of neutral salts should be avoided.

Seventhly. Flannel should be worn on the feet and next to the body.

Eighthly.—The following applications and medicines should be ready for distribution in every street, at convenient distances.

30,000 Leeches.

1,000 doses of Hyd. Sub. 20 gr. in each dose.

1,000 doses of the following

R. Tinct. Opii. gtt. lxxx.
Aquæ ℥ i.

1,000 papers of magnesia, 3 drachms in each.

1,000 Purgatives;
Pulv. Jalapii. ʒ i.
Potass. Supertart. gr. xx. mix in each paper.
200 Sinapisms, according to the form in the foregoing Section.

Directions to the following purport* are to be printed, and given with three doses of each medicine to applicants.

On the instant of attack, apply 50 leeches over the bowels, take a calomel powder and a draught. In the event of much burning sensation in the stomach, take a magnesia powder. Three hours after the taking of the calomel powder and draught, take one of the purgative powders. Should any of the medicines be rejected, the dose must be repeated until retained.

If the hands and feet feel cold, apply sinapisms to each.—To quench thirst, give gruel with plenty of salt. If this fails, aqua calcis will be successful.

On recovery, the antiphlogistic system must be pursued for some days.

* For the benefit of unprofessional persons, the directions should be expressed in the plainest manner, carefully avoiding all such technical terms as are not likely to be generally understood.

PART II.

A CRITICAL EXAMINATION

OF THE VARIOUS

PUBLICATIONS WHICH HAVE APPEARED

ON

CHOLERA.

The prevalence of the Cholera in an Epidemic form has given rise to a number of treatises, in which attempts are made to explain its proximate cause, from which the mode of treatment is necessarily deduced. Before I proceed to a consideration of the principles which the authors of these works have endeavoured to establish, I must take notice of those which form the basis of Dr. James Johnson's practice, as that gentleman considers the disease as an Endemic, to which the inhabitants of tropical climates are at all times liable. The distinguished author of the Influence of Tropical Climates on European Constitutions, and of the Influence of the Atmosphere on Health, was among the first to attract the public attention to the disease; and, accordingly it is to be supposed, that his views have had considerable influence in forming the opinions, and directing the practice of the medical officers of the three Presidencies.

Dr. Johnson thus commences his article on Cholera Morbus, in the first mentioned work: "From Hippocrates to Celsus, and from Celsus to Saunders, bile has been condemned without a hearing, as the original perpetrator of all the mischief. 'Bilis sursum acdeorsum effusiones,' says the first; 'bilis supra infraque erumpit,' says the second; and 'Cholera morbus,' says the last of these authors, 'may very properly be considered under the head of those diseases,

which depend on the increased secretion of bile.' Yet," continues Dr. Johnson, "I venture to affirm, that Cholera does not depend on an increase, but on a diminution, and in many cases a tota- suppression of the biliary secretion." He then goes on to quote from Rees's new Cyclopedia, in which it is stated, that "the bowels are seized with griping pains, and the stools which are at first thin and watery, as in common Diarrhœa, are passed frequently." "Now it does appear somewhat curious to me," he continues, "that if an increased secretion of bile were the cause of the disease, we should see nothing of it till a few hours after the effect becomes obvious." For the account, before quoted from Rees's Cyclopedia, which is taken principally from Sydenham, adds, that "in the course of a few hours the matter vomited, as well as that which is discharged at stool, appears to be pure bile, and passes off both ways in considerable quantities."

The statements of the symptoms of this disease, by Hippocrates and Celsus, have stood the test of ages; and as they accord with my own observations, I am compelled to dissent from the inference Dr. Johnson has drawn, which imputes to those ancient pathologists errors of such magnitude. I believe there may be as much variety in the symptoms of Cholera as in febrile diseases. It is known from experience, that Epidemical Fever is far more virulent and insidious than Endemical; and that its inflammatory nature in the latter, is exhibited by the skin being hot, while it is more frequently cold and clammy in the former; the dejections, also, in inflammatory Fever, of ordinary occurrence, exhibit copious discharges of bile, not so in the Epidemic remittent; an absence of biliary secretion being one of its most prominent and dangerous symptoms. Such is precisely the case in Cholera. The Epidemic shews an absence of biliary secretion, whereas that of every day occurrence, or that which is endemical, puts on symptoms as described by the ancient authors referred to. While, however, an absence of bile is an invariable symptom of the Epidemic Cholera, this disease does not, as Dr. Johnson maintains, "entirely depend on a diminution, or in some cases, a total suppression of the biliary secretion," although a return of that fluid into the intestines is one of the first symptoms of the recovery of a patient. But the fact is, that all the secretions are suspended, as I shall hereafter

shew, and we cannot charge any particular one of them with being the actual cause of the disease.

Dr. J. proceeds to observe: "In no part of the globe does this terrific disorder assume a more concentrated state than on the coasts of Ceylon." He next gives the topography of that country, and states, "that when the south-west monsoon passes with great strength over Ceylon, the wind by day is hot and sultry; yet, as soon as the dews have fallen in the evening, and evaporation commences from a very extended surface, the land-breeze is immediately rendered cold and raw, and being then loaded with vapour, together with all kinds of terrestrial and vegetable exhalations, communicates to the feelings a chill far exceeding what the thermometer would actually indicate." Cholera, in Dr. J.'s opinion therefore, exhibits "the dire effects of these atmospherical vicissitudes." This able writer then gives the case of a seaman, who, in a state of intoxication, exposed himself to a check of perspiration, and was seized with frequent purging and griping; his stools consisted of mucus and slime; nausea and retching succeeded, nothing being ejected but phlegm and the contents of the stomach; his pulse was now small, quick, and contracted; his skin dry, but not hot: about eight o'clock in the morning he began to feel spasms in different parts of the body, which soon attacked the abdominal muscles, and threw him into great pain. The warm bath, opium, æther, and various medicines had been tried without affording any relief. "This may serve," adds Dr. J., "as a specimen of the worst form of that dreadful disease." The Doctor next describes a common case of Cholera. "A seaman, from like exposure," says he, "to the cold land winds, after great fatigue during the heat of the preceding day, was attacked with symptoms nearly similar to the former; after the spasms came on, however, he had cold and hot fits alternately, with corresponding sweats, and bile appeared occasionally, both by vomit and stool." These symptoms never intervene in the Epidemic Cholera. We have never a hot skin, nor such a thing as bile; except when the patient is convalescent, and it is brought away by purgatives.

Dr. J. proceeds: "He had swallowed a scruple of calomel, and in this case blood was taken from the arm, which instantly alleviated

the spasms. In an hour after the calomel was taken, a purgative enema brought off several copious alvine evacuations, followed by large quantities of bile, some of which was highly fœtid and depraved. He now felt greatly relieved ; fell into a fine perspiration and sleep ; and by the next day, was perfectly well." The foregoing case is one of our Eastern hepatic obstructions, but differs very much from Epidemic Cholera.

Dr. Johnson now presents us with the pathology of the Epidemic from Curtis, a writer on the disease ; who shews, however, that in one species of Cholera, the mild kind, the dejections were evidently combined with bilious colluvies in the first passages.

This is confirmatory of Hippocrates, Celsus, and Saunders, not being altogether in error in their description. Dr. Curtis adds "that all fatal cases had watery vomiting and purging only, and that the whole system was in a state of collapse." Dr. Johnson having settled these points, now commences laying down his own opinion on the Proximate Cause, and deduces therefrom the treatment for these extreme and dangerous cases, which are attended with watery purging and vomiting, bringing on great weakness, coldness of the extremities, and a remarkable paleness, sinking, and lividness of the whole countenance. "The sudden and powerful check to perspiration, the unparalleled atony of the extreme vessels, debilitated by previous excess of action, and now struck utterly torpid by the cold, raw, damp, nocturnal winds, loaded with vegeto-aqueous vapour, and abounding with terrestrial and jungly exhalations, break at once, and with violence, the balance of the circulation. The extreme vessels of the hepatic system, sympathizing with those on the surface, completely arrest the reflux of blood from the portal, cœliac, and mesenteric circles ; hence in the worst cases, a total suppression of biliary secretion, with distension of the abdomen, and shrinking of all external parts." Dr. Johnson would have been correct in saying, that at once congestion took place, in the liver, in common with the other vessels of the intestines ; and that in consequence, the functions of the liver ceased to be performed in common with the other secretions. "If this continues any time, as in Mort de Chien, death must be the inevitable consequence, notwithstanding the unavailing efforts which nature makes by vomiting to determine to the surface, restore the

equilibrium of the blood, and of excitability, and with them the functions of perspiration and biliary secretion. With respect to the spasms, as they are totally unaccounted for by my predecessors, neither am I bound to dive into the mysteries of the nervous system for a solution of the phenomenon. I can easily conceive, that the brain must suffer, from the broken balance of circulation, as well as from its known sympathies with the stomach and liver, and thus, in some measure, account for the unequal distribution of nervous energy, which may excite cramps, and throw various muscles into convulsive agitation. Nor is this investigation of the proximate cause of Cholera, a subject of mere curiosity. It is highly useful, inasmuch as it strongly confirms and elucidates the principle which I have kept in view through various diseases in this essay; and what is of more consequence, it points directly to the most indispensable part of the cure in the awful and terrific forms which the disease assumes, in these parts of the world, namely, the early restoration of balance in the circulation and excitability."

Thus stimulants, or those medicines which will excite, are according to Dr. Johnson, indicated; he therefore goes on to lay down the treatment, taking Dr. Paisley as his guide. It will be necessary to quote this part at length.

"In strong habits," says Dr. Paisley, "when the pulse keeps up*, evacuations should be promoted both ways by a vomit of two or three grains of emetic tartar. In relaxed habits, where the pulse sinks suddenly, and brings on immediate danger, the same method must be pursued, but with greater caution. The emetics and purges must be gentle, and made cordial with wine and spts. lavend.: laudanum must be at hand to gain time; and though it is a dangerous expedient to suspend evacuations where putrid bile lurks, yet, of two evils, the least is to be chosen; for the patient must sink to death if a respite from evacuation, pain, and spasm, is not procured."

"Nothing so true as this last," exclaims Dr. Johnson, in haste to bring the principles of excitability into operation, "nature is here, as it were, stunned with the blow, and the struggling which

* This is rarely the case in Epidemic Cholera; the first effect is the sudden sinking of the pulse.

she makes to relieve herself by vomiting, &c. only exhausts her the sooner, if not effectually assisted by art. We must, therefore, have recourse to more powerful means than wine, laudanum, or lavender. The warm bath, cordials of the most stimulating kind, such as punch, or toddy, must be added to opium and calomel, together with friction, hot flannels, &c. In short, every thing must be tried to determine to the surface, and restore the equilibrium of the circulation and excitability." I am at a loss to conceive how Dr. Johnson should have permitted himself to be thus carried away by such erroneous as well as contradictory opinions. What! when nature is overcome by excitability, and *the struggling efforts which she makes to relieve herself by vomiting, &c. only exhausts her the sooner* if not effectually assisted by art, to exhaust her by adding more excitement? For the art Dr. Johnson employs consists in even more powerful stimulants than wine, laudanum, and lavender—cordials of the most stimulating kind; as if he would not allow nature to exhaust herself by her own high state of morbid excitement, with which she struggles by violent vomiting, incessant spasms, and burning sensation in the stomach and bowels, but must actually heap live coals on the fire! Such pathology and such therapeutics, however, have had innumerable admirers; and I lament to say, that the erroneous system has been too generally adopted, as I shall proceed to shew, throughout India. But what, I may inquire, could Dr. Johnson's intention be in combining stimulants with calomel and laudanum? Does he not know that the latter are sedatives? Has he forgotten Mr. Neill's, Mr. Cunningham's, and his own success, when they all used scruple doses of calomel in Dysentery; and what were the effects? Surely they did not operate as powerful stimulants, or irritate. Did they not ease the tormina, and lessen the propensity to stool? Surely, there is nothing irritating in that medicine which has such a soothing result as to remove tormina. If Dr. J. will admit that scruple doses of calomel are sedative, how can he reconcile that mode of prescription, which unites calomel and opium with stimulants?

Our author further observes: "I have not mentioned venesection, though, from its instantaneous good effect in three *desperate cases*, I am inclined to think it might prove a powerful auxiliary

in relieving the brain and other internal organs." This seems a strange doctrine of cure, viz. *restoration of excitability* by stimulants, and, at the same time *restoration* of the circulation by bleeding! The latter would operate on the constitution by allaying excitability; while the former would have the very opposite effect. Those three desperate cases, however, to which Dr. Johnson alludes, ought to have shewn him, that the effect of Cholera was inflammation. The two cases of dissection which he quotes from Curtis, exhibited a turgid state of the vessels of the lungs, liver, and mesentery. With the knowledge of such plethora, it is, I repeat, impossible to reconcile such discordant reasoning and treatment.

In the other work of Dr. Johnson's, which I have mentioned, The Influence of the Atmosphere on Health, I am happy to see, under the article Cholera Morbus, a more judicious mode of treatment; but be seems to be unacquanted with the sedative effects of scruple doses of calomel in this disease, since the largest dose of calomel he prescribes is 10 grains. He says not a word about bleeding. He has also changed his opinion respecting emetics. The following is an extract: "We are so rarely called in to Cholera, before re-action has commenced, that our principal indication is to moderate the orgasm by which nature is effecting a cure*; but which is sometimes so violent as to destroy the life of the patient in the attempt†. The plan of giving warm water, or even emetics, to unload the first passages, was probably founded on the erroneous opinion that the lurking collection of bile was the source of the mischief. But that this is not the case may be proved from the fact, that at the beginning the appearance of the bile is natural; but in proportion as the disease continues and becomes dangerous, the discharges assume a darker and more vitiated hue, till blood appears to be poured from the hepatic ducts, in company with such acrid secretions from the liver and digestive organs as contribute to the destruction of the parts through which they pass. Where the disease is not violent, mild tepid drinks at the beginning may not be injurious; but emetics can rarely be taken with impunity. From experience in warm climates, where the disease is

* This is unquestionably true.

† Consequently sedatives are indicated, not stimulants.

infinitely more terrific than here, (England,) the best practice will be found to consist in allaying the gastric and hepatic irritability by pretty large doses of solid opium combined with calomel, (say for a grown person from five to ten* grains of calomel with two or three of opium,) and to immerse the patient, as soon as possible, in the warm bath, which will bring the circulation *to the surface*, restore the balance of excitability, and check the vomiting and purging."

Let us now proceed to a consideration of those works on the subject which develope opinions derived from reasoning on principles of analogy. Collapse, which is always present, or in other words, a cold clammy skin accompanied with a feeble pulse, has been deemed a symptom exhibiting a direct diminution of the capability of the organic system; and a restoration of excitability is, according to Dr. Johnson, the first and principal indication of cure.

Mr. Orton†, in search of analogy, finds it in the memorable experiment of Mr. Brodie, of supporting the heat of life in an animal by artificial respiration; in which after the head was removed, the circulation went on for a considerable time, but both the generation of animal heat and the secretions ceased, thereby proving that the circulation of the blood is a separate process from the two last, but equally with them dependent upon nervous influence, as it was only maintained by the artificial action of the lungs. By so strong an analogy does this gentleman trace a cause why the generation of heat ceases, and the secretions are arrested, as in Cholera; which induces him to believe the proximate cause of Cholera to be a privation of nervous influence, produced in the various organs, causing all the functions of life to be either deranged or stopped. It having been proved, says Mr. O. that generation of heat cannot take place without nervous influence, the privation of that influence therefore accounts for the remarkable coldness of the body in Cholera. Mr. Orton, assuming the truth of his proposition, refers the diminution of nervous energy to a deficiency of electricity in the atmosphere. These views are so remote from the conclusions, we are constrained, by the results of

* If my readers will refer to Part I. Sect. XI. they will observe how greatly Dr. Johnson and myself differ in the use of calomel in this disease.

† Essay on the Epidemic Cholera.—Madras, 1820.

clinical practice, to come to, on this important subject, that I conceive it unnecessary to detain the reader with a detailed examination of Mr. Orton's theory.

Mr. Searle's * views are very similar to those which, we shall find in another part, are entertained by Mr. Alexander. He is of opinion, that the primary operation of the morbific influence is production of torpor of the cuticular capillary circulation, by which the blood is imperfectly decarburetted, and defectively oxygenated; hence the diminished evolution of vital temperature and nervous energy and debility of all the functions. Mr. Searle, taking up the new theory by Barry, observes, "In a ratio with the heart's defective power in its two-fold agency of a forcing and a sucking pump, which office it is now well known to possess†, will accumulation of blood take place in the veins, and the congestion will necessarily be, to the greatest extent at that point the most remote from the heart's influence; which obtains in a manifold degree in the mesenteric, gastric, and splenic veins, forming the roots of the vena portarum. As the propelling action of the ventricle ceases in the arteries, and the sucking power of the auricle's dilatation has to operate on these vessels, through the additional, lengthened, and protracted routes both of the hepatic veins and vena portarum; hence the distention of the mesenteric and gastric veins, and sense of præcordial oppression." How indebted ought Mr. Searle to feel therefore to Mr. Barry, for the discovery of his ingenioustheory! it helps him over the most difficult part of his own hypothesis on the proximate cause, having already accounted for evolution of heat while congestion existed in the centre; but Mr. Searle is involved, unhappily for his theory, in great intricacy, by another greater difficulty, inflammation, which he is compelled to acknowledge occurs in one stage of Cholera. "The severe grades of the disease marked by inflammation and spasm, come next to be considered, and are as readily accounted for, by pursuing the same reasoning; adding to the consideration difference of temperament, idiosyncracy, state of the individual at the time of the attack, a greater or

* Cholera Pathologically and Practically Considered.—Madras, 1828.

† We might inquire of Mr. Searle whether he has heard of another new theory, viz. that the glottis is supposed to be the auxiliary agent to the heart in the venous circulation, as set forth by Professor Mende, of Gottingen.

less intensity of the cause, and treatment pursued. Thus, I should say, if the exudation from the mesenteric and gastric vessels does not take place, or is not equal to the relief of the distended veins, free egress of blood is not admitted from the capillary arteries; and the consequence is, they become irritated by distension, and excited into inflammatory action." Hence "the sense of burning heat, pain, extreme restlessness, and irritability of stomach, desire for cold water, the symptoms specifically denoting inflammation of these organs." Mr. Searle therefore directly proves, that the disease is inflammatory, for Epidemic Cholera is distinguished always by the above symptoms; but how palpably does this gentleman confute his own reasoning? Where is the evolution of heat now? Why, according to his own shewing, it has left the skin and seized the bowels and stomach. Contradictory as this gentleman's reasoning on the proximate cause is, equally so his recommendation of the mode of treatment. In the first stage, "the remedies indicated are of two-fold operation, stimulant and evacuating. A scruple of calomel with a spoonful or two of warm brandy and water should now be administered, and the latter repeated in the same quantity every five or ten minutes." Mr. Searle was himself attacked with the disease, and my readers will not be less astonished than I have been myself, to perceive that he should have been so far led away by theory. The above indications of cure were actually contradicted by practical experience on himself. In the treatment of his own case, he remarks as follows: "I beg to observe, that during the whole of the time my senses were entire, with the exception of once for a few moments, when faintness and vomiting supervened, on attempting to sit; that the remedies prescribed were dictated by my feelings, which soon convinced me the præcordial oppression was from the congestive state of the stomach and bowels, as the *stimulants* I took *afforded no relief* in this particular, whereas the *evacuations invariably did so more or less.* The irritating glysters were, therefore, obviously indicated, not only with this intention, but also in relief of the stomach, which was twice suddenly excited *to vomiting by restraining the bowel's action;* the *latter* I am therefore convinced, *is a curative effect of the system.* Indeed I felt this so much to be the case that I pursued the hint, and have *reason to suppose my rapid*

recovery attributable to it. Had I, on the contrary, restrained this by opium and *stimulants, inflammation would have become developed with its attending symptoms, burning heat, extreme restlessness, and irritability of stomach, cold sweats, and the like, or spasms, with their exhausting influence.*"

Dr. Kennedy* prefaces his opinion on the proximate cause, by exhibiting a series of analogous circumstances, to shew that concussion of the brain is the *Lethi fabricator* in Cholera, and that the purging and vomiting are sanitary processes. He does not pretend to say how this concussion is induced; but such an inexplicable shock is, in his opinion, sustained by the constitution, that the collapse and spasm are symptomatic of the disorder of the brain. Hence he considers the purging and vomiting to be no part of the disease, but the struggle and effort of nature to relieve the constitution, and cast off the noxious principle which is destroying it; but what that noxious principle is, Dr. Kennedy, leaves for those to speculate upon, who can tell him what gout is, or what the ague is, or in short what any other disease is. To say, however, that the purging and vomiting are no part of the disease, we might as well say the dejections, which are the principal symptoms in diarrhœa, are no part of that disease; because it is the effort of an irritated intestine, to produce those discharges; but that Dr. Kennedy is full of error in forming such a conclusion he will find by his own shewing, that promoting such sanitary effects as he terms vomiting and purging, hastens the accession of the disease. The indication of cure in the first stage, Dr. Kennedy informs us, is that stated by Capt. Sykes, that bleeding with an emetic and cathartic served to relieve the patient in a few hours. "This was decisive and philosophical practice, whoever pursued it, and I wish the surgeon himself, instead of an accidental unprofessional observer, had published it; he probably might have saved me the trouble of writing this work, or at least he would have mentioned his reasons for the practice, and what emetics and cathartics he used, and the exact number of hours in which he was able to administer the cathartic after the emetic." Dr. Kennedy, therefore, lays down the above treatment of the Captain, for future guidance. "In September, 1818, a patient

* Notes on Epidemic Cholera.—Calcutta, 1827.

applied to me at my dispensary for medicine, having, as he thought himself, and I thought also, the chill of an incipient cold fit of ague on him. I gave him immediately an emetic, bade him go home, and drink freely of hot-water, and ordered one of my establishment to give him a purge in the evening, and after freely evacuating his bowels, to supply him with bark, &c. and in less than an hour afterwards I received information that the poor creature had the Cholera, on which I hastened to his house, and found it was the case." What does my reader think now of purging and vomiting being sanitary processes? The poor patient appears to have had no Cholera, until Dr. Kennedy gave it to him by the emetic. "When the disease was clearly developed as Cholera, the watery evacuations forcibly ejected with spasmodic violence upwards and downwards, cramps and collapse all present, but not of many minutes' continuance, except the last, which I had mistaken for an ague, I resolved to diminish the circulating fluid from which alone these secretions could be furnished, which I hoped might stop the evacuations by *relieving the determination towards the bowels*, without the existence of which congestion, I considered it impossible such extraordinary quantities of unnatural matter could be supplied*." So that after this physician had procured or accelerated the disease, he very judiciously proceeds to remedy it, not by fixing his attention to the head, but to the loaded bowels. "I accordingly opened a vein, and with much difficulty extracted twelve ounces of blood: with the *extraction of blood, however, the vomiting ceased, and the cramps were wonderfully relieved*†, *and the returning warmth was evident; when on the patient's complaining of a heat like a fire in his stomach, I administered a full dose of laudanum and castor oil*, followed at intervals of half an hour with pills of camphor and opium, until he fell asleep‡. The next morning he appeared at the dispensary door to report himself well."

Now this is curing the patient by sedatives, his full dose of laudanum was a drachm, and the bleeding combined therewith evidently soothed that irritability which Dr. Kennedy had previously and

* Whence a cold clammy sweat pours out through the pores of the surface, which according to my principles, is effusion on the skin.

† On the cessation of vomiting.

‡ Let the reader mark the effect of this sleep.

imprudently excited. After such results, we might reasonably have supposed that he would have let his theory of concussion fall to the ground: so far from this being the case, nearly 25 pages are devoted to an attempt to prove this theory by analogical reasoning. It is but justice, therefore, to Dr. Kennedy, to look into the merit of his belief. The two first cases of the disease, the Doctor had seen, terminated fatally, and were examined in the presence of four medical men with a degree of scientific accuracy seldom resorted to in India. The stomach and bowels were found every where in a state of inflammation and extensive gangrene; which must have followed inflammation of a more acute character. Dr. Kennedy was desirous of attributing this appearance to the spasms to which the bowels had been subjected, and the distension which the blood vessels may be presumed to have undergone, from the determination to the secreting surfaces employed in the formation of such loads of vitiated discharges. On our physician's proposing to open the head, his friends received the suggestion with ridicule as a supererogatory measure; and when they conceded the point, it was rather as indulging him in an eccentric whim than as considering it of the least importance. Dr. Kennedy now pointed out what appeared to him an over-turgid state of all the blood vessels, and the specks of blood which started up under the scalpel in cutting transversely downwards and outwards, even through the substance of the brain, as proofs of serious disease or of some extraordinary excitement. After this examination, Dr. Kennedy declares that he never afterwards examined a patient who died of Epidemic Cholera, in which he did not find the same, or far more decided appearances. In confirmation of his statement, he brings forward the following *post mortem* observations of Mr. Craws*. "The most expert anatomist could not have injected the ten millionth part of the vessels which now covered the membranes and surface of the brain. It appeared, indeed, as if the whole was nothing but a mass of blood vessels, and every little branch seemed so entirely distended and glutted as if one drop more must have ruptured it. There was no effusion of fluid on the surface nor in the ventricles, but if the patient had lived a few hours longer, either this or an effusion of blood must have

* See Bombay Reports.

inevitably happened." I am sure my readers will agree with me, that in the foregoing examination we see nothing more than congestion and inflammation, and that the cerebral only partakes with the other important vital functions, in great determinations, arterial and venous. Dr. Kennedy was told by a friend he much esteemed, and to whom he shewed his notes, that he was quite opposed to this theory of concussion; that instead of concussion of the brain, he believed that the oppression was on the circulating system, and it would be more fitly termed concussion of the heart.

What seems to have bewildered Dr. Kennedy, with the other authors I have quoted, was that symptom, the collapse, the cold skin; arterial determination was not so analogous as a shock to nervous influence. This gentleman acknowledges, that the history of concussion of the brain from mechanical violence, general shock, or local injury, must be very different from the same effect produced in a manner so widely different, as when it follows or accompanies high nervous excitement, or disease; but a reference to the symptoms by analogy, he thinks, will prove his own theory. He tells us, therefore, that Celsus distinctly states vomiting to be a symptom of injuries of the brain or its membranes; and that in the opinion of Mr. Pott, very alarming symtoms in concussion occur, while on examination after death, neither fissure, fracture, nor extravasation of any kind was discovered. Mr. Pott further shews, that death follows concussion, without there being any organic injury of the brain perceptible on the most careful dissection. Surely then, this fact at once contradicts Dr. Kennedy's theory, when in all choleric brains there is great congestion; but then Mr. Pott shews sometimes a delirium, sometimes frequent spasms, disorder and shake the whole frame; the eyes lose all their natural brightness, and seem sunk in their orbits: these are analogous symptoms in Dr. Kennedy's opinion. Thus Celsus supplies the symptom of vomiting; Pott, eyes sunk and spasms; and he now refers to Bell for debility. "I have already," says Bell, "endeavoured to shew, that concussion of the brain appears to operate by inducing debility of the whole system; our remedies, therefore, instead of tending to increase this, as blood-letting very certainly does, should be such as give additional vigour." Here then is a difficulty into which Dr.

Kennedy brings himself. How does he reconcile bleeding, emetic and cathartics, with the means of giving vigour? We will see how our reasoner by analogy gets out of the scrape. "The facts stated here," says Dr. Kennedy, "are all perfectly correct; but the theory grounded upon them is exactly the reverse, and the oversight is this, that the author merely attends to the shock which nature has received, and does not remember that such shock is merely nervous, and not inanition; and that its secondary process, if the patient survive at all, must be discharged either by a fever or a critical evacuation, in either of which alternatives, his stimulants must prove the most injudicious practice he could propose." Now I beg leave to differ with Dr. Kennedy, about the secondary process; I declare that it is inflammation, and whatever fever intervenes, it is a mere symptom of inflammation, and bleeding is indicated accordingly, and nothing will do in these cases but immense bleeding. Our Author, however, finds out in Bell what gets him out of the greatest difficulty of all,—how concussion of the brain can take place without mechanical injury. Bell observes, that concussion of the brain operates upon the system in nearly the same way as syncope induced by fear, inanition, or any similar cause. This is Dr. Kennedy's illustrative simile, not intended to be literally understood, that syncope itself is concussion of the brain, but the fact on which he hinges his arguments, and the view in which he wishes himself to exhibit it. "If therefore," he inquires, "syncope from fear be not concussion of the brain, what is?" So that this long inexplicable something which has caused this concussion, is at last found out to be fear!

It is interesting to follow our author into this part of his reasoning; into which I hope my readers will excuse my taking them along with me. Dr. Kennedy expresses his apprehension, that he may be supposed to descend below the dignity of philosophy, when he alludes to the more common effect of vulgar fear so inimitably described by Cervantes, as occurring to the matchless Squire Sancho in the tremendous night-adventure of the fulling mills. What is it, he inquires, that in a case of extreme terror, occasions a sudden paroxysm of vomiting and purging? When a person dies of fear, adds our physician, or when a poor creature becomes insane, a timid idiot, after an agony of terror,

perhaps in early childhood, and never recovers through life ; there is no difficulty in understanding that the shock has reached the brain ; but how unless by concussion from inordinate nervous excitement ? And when the trembling of the limbs, and cold sweat of an oppression from fear are relieved by the vulgar termination, which is the common jest of clowns, how are we to explain it that such is the course of nature in all cerebral affections, unaccompanied by inflammation ? Dr. Kennedy, many years ago made one of a hunting party, where after a morning's enjoyment, they rested at noon for refreshment, in a ruined Mahommedan tomb. The building was very extensive and very lofty, and like all others of the same order of architecture, was what Dr. Kennedy thought the Italian architects term a lanthorn, that is, having a vast number of open arches in every front, and exactly opposite to each other, so that when seen at a distance it had more the appearance of the skeleton of a building run up to get the roof on quickly before an apprehended change of the weather, than a finished work. While the meal of the party was preparing, some of the young men were chasing each other up and down the narrow, slippery stairs of the tomb, from story to story, and chamber to chamber ; but the majority of the party were seated in the uppermost room enjoying the beauty of the prospect. Suddenly the noisy revellers burst into the apartment full cry, and, rushing through it, descended by another stair-case opposite to the one by which they had ascended. One of them, outstript by his play-mates, entered the room just as the rest were out of sight ; and the sound of their shouts misleading him, when hurrying at full speed, in his ignorance of the geography of the doors and windows, he ran with all his might at a window, nor could he correct his mistake, until he stood balanced on the very brink of what might be termed its threshold. Never were a company more petrified with horror than this of Dr. Kennedy's. The young man appeared to all human help lost ; for in their alarm he seemed to be actually beyond the window, which they knew to be almost ninety-feet from the ground, and a stone pavement beneath. In this dreadfully hazardous situation, he remained a second or two, apparently rocking backwards and forwards, losing and recovering his balance, until at last, uttering a faint shriek, he fell backward in the room.

On lifting him up, Dr. Kennedy found him cold, and a clammy perspiration streaming from every pore. He could answer every question put to him, but seemed in other respects unconscious of what was passing, and, as he sat on the floor, stared wildly round with the most frantic bewildered look that could be imagined. Dr. Kennedy apprehended, that loss of reason at least would be the consequence of concussion. Want of instruments precluded also abstraction of blood; but vomiting was promoted by salad oil and warm water, a cathartic administered, and the patient recovered. This is given by our physician as a case analogous to concussion in Cholera, produced by fear. As far as the analogy is drawn by Dr. Kennedy, it must be allowed, that the excitation of the whole of the nerves of the countenance, on the application of any noxious offensive matter to the olfactory nerves, and the sickness thence produced, sympathizing with the stomach, is correct and tenable; but who will say that this sickness is a sanitary process? It is excitation by sympathy; if such excitation is sanitary, then I concur in the proposition of this physician; but surely, as in Cholera, that distressing and agonizing straining which attends the vomiting, must be one of those powerful efforts of constitutional spasm which exhausts the powers of life in so few hours from the accession of the disease, and any thing tending to increase it must be pernicious.

Mr. Annesley* holds the same opinion as Messrs. Orton and Searle, saving, that in the latter gentleman's inference of inflammation from the turgidity in the vessels of the brain, Mr. A. does not concur. He allows, that when the small intestines were laid open, their upper portion was found dark-coloured and congested; in the lower part particularly, where the ileum is blue, or purplish externally; when the disease was of longer continuance the mucous coat then seemed more vascular, and the arterial capillaries appeared more injected: congestion of the veins and venous capillaries was generally evident on the large intestines, especially of those seated in the cellular substance, connecting the tunics. The external coat was generally dark-coloured, owing to the blackness of the blood in the congested vessels, the mucous surface was frequently very vascular, sometimes it presented a dark red colour;

* Treatise on the Epidemic Cholera of the East, 1825.

especially if the patients had lived for some time, and strong *stimulants* had been administered. Let me ask my reader's attention to this last important remark of Mr. Annesley's: he generally found the liver darker than natural, and loaded with black and thick blood; the spleen was generally enlarged, and engorged with black blood. The peculiar appearance of the blood particularly excited Mr. Annesley's attention in the first case of the disease which came under his attention. In every dissection which he performed, he uniformly found the vena cava, the mesenteric veins, the veins in the vicinity of the heart, the vena portæ, the iliac, and subclavian veins, and the sinuses of the brain, loaded by a thick, viscid, and black blood. The right cavities of the heart were generally distended with the same description of blood, and when any was found in the left cavities of this organ, it was similar in appearance to that lodged in the right; the lungs were always completely engorged with blood of a pitchy and black appearance, and all the internal viscera presented a greater or less degree of congestion of blood, possessing nearly the same characters. The blood vessels at the extremities were generally contracted and empty, or nearly so. That this state of the blood was the first material derangement consequent on the invasion of the efficient cause of the malady, Mr. Annesley will not contend; but that it was one of the earliest links in the chain of effects consequent to that cause, and that it afterwards tended by a necessary and evident process to heighten and to perpetuate the derangement, whence Cholera itself sprung, he had not the least doubt. He believed the nervous influence, in some manner or other, received the first impression of the morbid cause, and afterwards gave rise to this condition of the circulating fluid, inferred from a diminished function of the lungs, liver, and the excerning viscera, existent or nearly so with that primary change, in consequence of which the blood does not undergo an elimination of its effete and noxious constituents, to an extent requisite to the performance of the organic actions, and the continuance of life. So that the long preamble about this black blood was merely to usher in the cause of the skin being cold or clammy; or, in other words, that there was either a diminished evolution of carbon from the blood or an impeded absorption of oxygen

into it. "Either alternative," says Mr. Annesley, "will suit my argument very well."

Our author is confirmed in this opinion, because Dr. Davy analysed the expired air of the sick in cases of Epidemic Cholera*, and found that it did not contain more than one-third of the carbonic acid usually contained in the breath of healthy subjects, two-thirds being retained in the blood. He then goes in quest of analogy, and finds Bichat proving, that when black blood was injected into the vessels of the brain, the functions of this organ became immediately disturbed, and very soon ceased. He adverts also to Mr. Brodie's experiments†, by which it appeared that dark-coloured blood, which has been transmitted through the circulating system, during the suspension of respiration, would seem to act like a narcotic poison upon the brain; but how is this change produced? We are informed by Mr. Annesley, that the best authorities admit, that extreme vicissitudes and irregularity of seasons, great excess of cold, heat, moisture, or drought, are productive of disease. Mr. Ellis is brought forward to support our author in the opinion, that any cause, as cold, checking the circulation, restrains the production of carbon; or such variety of seasons, which have been mentioned, cannot exist, without producing corresponding alteration in the composition of the atmosphere itself. Mr. Annesley then refers to the experiments and researches of modern philosophers, who agree, that electricity enters into the composition of the material substances, and refers to John Hunter's remarks, that a subtile substance, of a great and powerful mobile nature seems to pervade every thing and appears to be the life of the world, and that it is probable a similar substance pervades organized bodies, and is the life of those bodies. Illustrative of this fact, our author remarks, that what is perceived in the course of our daily observations, the sympathies that exist between the brain, the stomach, and other parts of the body, the instantaneous effects sometimes manifested in what is called irritability, are proofs of

* How important is the observation that no experiment, however expert the chemist, however talented the experimentalist in the field of science, ought to supersede clinical experience!

† It is lamentable to see this gentleman's talented mind so deluded by attending to the theorizing of others, rather than adhering to his own practical inferences.

these propositions. Mr. Annesley regards, therefore, Epidemic Cholera as essentially an affection of the nervous system, and considers the diminution of the nervous power to be the proximate effect of the efficient cause of the disease, that cause being the electrical condition of the air, arising from, or accompanied by terrestrial exhalations of a kind unfavourable to animal life. That the affection of the nervous influence soon affects the blood, appears evident, and that the black unoxygenized state of this fluid heightens the previous derangement, and leads to the extinction of life itself, seems to him equally probable.

From this theory, deduced from analogy, we may readily conceive what, in Mr. Annesley's opinion, would indicate the method of cure. If the disease be treated as one depending upon debility alone, without attempting to remove oppression, the practice will be at least uncertain, and in general unsuccessful. Mr. A. is, therefore, of opinion that the oppression is caused, not by inflammation, but by congestion; and he explains how congestion can exist without inflammation, by the odd doctrine of evolution of heat, by deprivation of oxygen in the blood. "Examinations of the bodies of patients who have died of the Epidemic Cholera, prove incontestably that the system has been oppressed by venous congestion, and that the general disturbance of the constitution has arisen from this cause. The various changes which take place in the circulating fluids, early in the disease, may probably arise from this effective cause of abstracting vital power, acting thus as a specific poison, and destroying the balance of circulation. Hence the blood is imperfectly propelled to the surface of the body, accumulates in an unusual quantity in the right cavities of the heart, in the large venous trunks, and in the lungs; and owing also to its high state of carbonization, or defective state of oxygenization, overpowers the remaining energy of the heart and lungs, and deprives them of the power of performing their functions with regularity. The mass being thus oppressed and overloaded, has not the power of oxygenizing or decarbonizing the blood, and hence black blood is returned to the left auricle and ventricle of the heart, which being deprived of their natural stimulus, cease to act with their usual energy, and consequently the circulation generally becomes languid." "If this view of the subject be correct,

the indications of cure will be self-evident, viz. to remove the oppression from the venous system and restore the balance of circulation, are the chief objects we should propose to accomplish. Bleeding, therefore, when it can be effected, should never be lost sight of; the object of resorting to it, is to diminish the quantity of this fluid, in order to release the heart and lungs from oppression." Not inflammation! What does Mr. Annesley mean by this increase of blood in the heart and lungs, and all the visceral and cerebral functions? Congestion! What is it that excites that burning heat in the stomach and bowels? Evolution of heat of oxygen from the blood! What is it that occasions those shrieks for cold water? Deprivation of stimulus! What then is congestion? A mass of blood accumulating on the most delicate and in the most vital functions, and where that morbid accumulation of blood is, will there be an absence of heat? What would be the symptoms of such an effect? Why the stomach and bowels would be insensible to heat! But are such the symptoms in Epidemic Cholera? No! the very reverse.

Let my readers behold the bane of drawing pathological conclusions from analogical reasoning. I would tell all these authors, whom I have hitherto examined, that this congestion is inflammation exhibited by an undue sense of heat of the chest, and other internal organs: and are not these the symptoms in Cholera? But to what do these erroneous deductions lead our authors? Why, while debility and a cold skin are, as Mr. Jukes, says, the "scare-crow," they bleed not with a view of depletion, or preventing inflammation, and thus allaying irritability, but to diminish the volume of blood, that it may again circulate; and then we must have that to make up for this deprivation of oxygen, this want of excitability. To restore the balance of circulation and excitability, we must also stimulate: we are to have two powers at work, at the same time, one to knock down with bleeding; the other to pull up with brandy and water. I would inquire in this place, however, whether the blood being black is a proof against an inflammatory principle? All *post mortem* examinations exhibit inflammation by congestion in the large trunks; but I have had occasion to touch upon this subject fully, in my view of the proximate cause, Part I.

Let us bring Mr. Annesley's theory to the test of his clinical practice; the best and surest mode of proving the soundness and truth of doctrines proposed for adoption. We will therefore turn to that section of his work, which gives a detail of cases, illustrative of the pathology of the disease and treatment. The first case is that of James Lynch: the patient took stimulants with opium and friction, applied warm bricks to the extremities, and three veins were opened in the arm. The above treatment was by Mr. Conwell. When Mr. A. saw the man, warm stimulating applications were applied to the extremities and body; he was put into a warm bath; brandy and water were given him to drink, which he took with avidity; and after he was removed from the bath he was dried in warm cumlies*, a stimulating injection was given, and sinapisms were applied to the legs. He died. Dissection shewed the coats of the intestines much thickened; the duodenum, and jejunum were of a pale vermilion colour†; the ileum was of a darker hue, its calibre much contracted; about two feet of this intestine, near its entrance into the cœcum, had a dark-blue colour, and the veins upon its surface beautifully injected ‡; *a vascularity* in the external coat of the small intestines; the whole internal coat of the colon from the commencement of the transverse arch to the rectum was of a dark *red* colour, the pyloric orifice of the stomach was corrugated, of a dirty and darker colour than natural, with some bruised spots between the coats. The pyloris had a bright and gelatinous appearance, the convex part of the right lobe of the liver was of a purple and mottled hue, and the inferior concave surface of the same lobe was of a dark-blue colour; this part on being cut into, emitted freely thick black-coloured blood: *adhesions between the lungs and the pleura costalis were found*, and the vessels filled with blood, but the whole posterior portion of the lungs presented precisely the appearance of a solid mass of bruised bloody flesh, and when cut into, had a flesh-like structure, it gave out profusely a black thick blood; the blood vessels of the heart were turgid, the vessels of the dura mater were in a very

* Indian blankets.

† What is this, but incipient inflammation?

‡ Can there be stronger evidence of inflammation?

turgid condition; between the tunica arachnoidea and the pia mater in the middle lobe of the right hemisphere was a *considerable effusion of dark coloured, gelatinous bloody lymph*, as if a severe blow had been inflicted on that part; the vessels of the pia mater were very turgid and of a darker colour than Mr. A. had ever before seen; then there was *a little water* in the left ventricle; the vessels of the choroid plexus were very turgid, giving it *a dark reddish brown* appearance; the vessels of the cerebellum were precisely in the same state of congestion as those already described; a small quantity of water was found lying in the cerebellic cavity and top of the spine. I may now inquire of my readers whether there was ever more extensive inflammatory ravages exhibited than in this dissection; and yet mark how it must have been aggravated by the use of stimulants!

The second case is a Sepoy. The application of nitric acid as a quick and effectual blister was ordered; it did not vesicate; a mustard cataplasm, with a little vinegar, was therefore applied, and a draught of æth. sulph. ʒ i. opii gtt. l. aquæ cinnamon. ℥ i. aquæ pur. ℥ i. given. Warm frictions were applied to his extremities, warm brandy and water administered occasionally, the vapour bath was used, and spirits of turpentine applied to the extremities; an anodyne injection followed; he called anxiously for rice water with brandy. He died. Dissection exhibited similar appearance to the foregoing, but the intestinal coats were of a lighter vermilion or flesh colour.

The third case is James D'Arcy. Took tinct. opii gtt. l. tinct. valerien. gtt. l. aquæ ℥ i. in half an hour afterwards the same dose of tinct opii, and 90 drops of tinct. valerien: a vein was opened, no blood followed. The patient took 170 drops of tinct. opii; a medicated vapour bath; ½ past two o'clock, another drachm of laudanum, with the same of æther, in one ounce and a half of camphor mixture; warm brandy and water was given frequently; a vein was again opened in the arm, and a few drops of black sizy blood came away; leeches were applied to the base of the head and his side; cupping was tried, but no blood was found on the surface; the draught and congee water, with brandy, were repeated; spirituous embrocations rubbed upon the extremities; the nitric acid blister was applied with very little effect; he got arrow root with brandy;

his breathing bespoke great distress and oppression, and the pain in his side increased; fifty minutes past three, two leeches which had fastened on his side only now fell off; but not one drop of blood flowed from their bites; arrow root and brandy are again given him;—he died. The appearances, on dissection, were similar to the preceding cases.

The fourth case is Henry Halding. Took two draughts, which were rejected; two veins were opened, eight ounces of blood taken, thick, black, and sizy, oozing out in drops; medicated vapour bath, with the draught; warm congee water with brandy to drink; spt. terebinth. rubbed upon the extremities;—he died. Dissection exhibited the usual appearance. The fifth case was Gardiner Wilson's. Took the draught and an anodyne enema, medicated vapour bath; and the limbs are rubbed with spt. terebinth.; at two o'clock draught repeated, one hour subsequent to the first; blistering plaster rubbed with the oil of turpentine over the chest, and a large mustard cataplasm over the whole; the enema warm repeated, with the vapour bath;—died. Dissections of the same general character.

Case the sixth is John Belsh. A vein was opened, blood abstracted, quantity not stated, thick, sizy, and black as ink; he took the usual draught, and had twenty leeches applied to the umbilicus as well as an opiate enema, with camphor; extremities rubbed as usual. These remedies were adopted at seven. Half past eight the leeches on the abdomen drawing well; repeat frictions and draught, continue the congee water, and brandy; half past ten, leeches dropped off; ten more applied; draught repeated;—the patient died. The same general appearances were evident on the abdominal viscera, as were remarked in former dissections.

The seventh case was John Brown. Bled 14 ounces; took draught and enema; an hour after calomel gr. xx. opii gr. ii.; one hour after the vomiting was stopped; calomel and opium repeated; had a medicated vapour bath; sinapism; brandy and water occasionally;—he died. There was more general appearance of congestion in the omentum, and small intestines.

The eighth case was Thomas Kershaw's. Eight ounces of blood abstracted; took draught; he also took within an hour one ounce of drogue-amere combined as follows: aloes lb. j, gum myrrhæ, gum mastick, gum benzoin, rad. Calumbæ, of each ℥ viij. cocus

angelic., rad. gentian. of each ℥v. eau de vie lb. xxxvi. Geneivie lb. xij. M. to stand forty days and then filter for use. Tobacco smoke was injected, and a medicated vapour bath administered;—the patient died. Dissection of the same character.

The ninth case was that of Jonah Reader. Took 20 gr. of calomel and two of opium; 15 leeches were applied to the abdomen, and five to the temples; sinapisms in an hour and a half. Cal. xv. grains, opii ij. g. draught every half hour, composed of camphor mixture, drogue-amere, some glasses of brandy, and lime juice; frictions; bottles of hot water; blisters, and repeated doses of calomel; but the patient died. The tenth, eleventh, and twelfth cases were all alike; one out of the whole recovered. The thirteenth was that of a gentleman, who would only be treated on his own plan; it is remarkable, that not a single stimulant was used, and he recovered.

What appears still more extraordinary is, that the effects of stimulants are shown in the following remarks by Mr. Annesley, in page 170, where depletion by bleeding combined with scruple doses of calomel and two grains of opium, cured in every instance. "Although I recommend bleeding to be attempted at all times, and in every stage of the disease; I am fully aware that many cases have recovered where it has not been used at all; nor do I answer for its universal success; but I do venture to assert, that if it can be accomplished in the early stage of the disease and before the circulation has ceased at the wrist, in nine cases out of ten, it will prove successful, especially if the colour of the blood change from black to red; if the pulse get up and the spasms be relieved. In confirmation of the opinion, I cannot do better than detail a circumstance, bearing upon it, which occurred at Madras, in 1821, and which has been alluded to already. The *General Harris*, East Indiaman, arrived at Madras on the 20th June, 1821. Her crew were in perfect health, and had been so during the passage from England. On the 27th of June, Epidemic Cholera made its appearance among them, and raged with great violence. Captain Webstead, and Mr. Colledge, surgeon of the ship, called upon me at the General Hospital, to consult upon the best means of curing, as well as preventing the disease. I stated my views fully upon this subject to Mr. Colledge, and the line of future treatment was decided upon. This gentleman was unremit-

ting in his attention to the men under his charge; and whenever he observed any of them distressed and low spirited, he at once inquired into their feelings, and without a moment's hesitation took twenty or thirty ounces of blood from the arm, gave 20 grains of calomel with two of opium, and sent them on shore, well wrapped up, to the General Hospital, under my charge; and the subsequent disease shewed what might have been expected from less energetic measures*. The disorder being thus checked, before it had made any great invasion upon the constitution, was, when brought before me, in a manageable state; and I looked forward with confidence to a successful termination of it, almost in every instance. Upwards of fifty men were landed from the *General Harris*, Indiaman, under the disease, and sent to the General Hospital; and it is with peculiar satisfaction I can say, *that the whole* number returned in health." Here then is a lesson and a guide for future treatment; not one of the admissions died. Under the article of treatment, therefore, in Mr. Annesley's work, he seems to be no longer an advocate for stimulants in the first stage; but recommends sedatives of calomel and opium, depletion by bleeding, and, of course, purgatives. But unhappily, Mr. Annesley's erroneous theory on the proximate cause presents that evil, that scarecrow debility, before his eyes; and if the skin appear to be cold from any delay in the patient reporting himself, he is an advocate for the use of stimulants. But I trust, the strong evidence I am about to place before him and the public, will induce him to correct that error, in the 2nd edition of his work. I have a high respect for this author: his talents and great zeal need not my feeble testimony.

Mr. Boyle, in his treatise upon this subject†, does not give an opinion on the proximate cause of this disease; but in the expression of his opinion of the treatment, he observes, "who can reconcile to himself the propriety of drawing blood from a patient whose pulse is almost imperceptible; the surface cold and covered with a profuse perspiration, and the countenance

* Now this is precisely the treatment I recommend, except that I suggested the tincture of opium as more rapid in its effects than that medicine in substance.

† Boyle's treatise on Epidemic Cholera—1821.

shrunk, and pale, exhibiting a death-like, ghastly appearance?" This is the "scarecrow,"—here are the appearances which have led our eastern practitioners astray. Reasoning from analogy, "few men," he says, "would bleed; but as it was strongly recommended, *and as the ancients were in the habit of bleeding in cases of suspended animations*," Mr. Boyle ventured, and we find him detailing three cases treated by venesection, large doses of calomel, opium, and strong stimulants, such as brandy, &c. They all died, and *post-mortem* examination exhibited the same condemning appearances of the practice, namely, inflammation. He has then recourse to ant. tart. and ipecac. comp. from which some cases recovered, which ought to be evidence sufficient against the former practice; but the latter was adopted under the supposition of some lurking accumulations of bile in the liver. Since the pathology of the disease shewed an absence of this fluid in the intestines and stomach, emetics were likely, therefore, to bring it from its lurking place, and hence cure.

The next work I have to consider, is Mr. Christie's*. This gentleman is of opinion that mucous membranes are liable to two distinct, simple, morbid affections, viz. inflammation and catarrh; the latter consists of a diseased action of the secretory apparatus of a mucous membrane, which produces an increased and vitiated secretion, and is characterised by the membrane, in which it occurs, being generally whiter than natural, and by the quantity of the blood towards the surface of the body being diminished; either of these morbid affections may occur alone, in a mucous membrane, or conjoined with the other. Some medicines produce an inflammatory, others a catarrhal action in mucous membranes; and a long continued action of certain medicines produces the former, while a short continued action of the same medicines produces the latter effect. This proposition Mr. Christie endeavours to prove by a series of experiments on animals, to which tartar emetic, calomel, opium, and muriate of mercury were separately exhibited; it was discovered by our author, that a scruple of tartrate of antimony powder fully increased the secretion of the gastro-enteric mucous membrane, without inducing inflammatory

* Observations on the nature and treatment of Cholera, and on the pathology of mucous membrane, 1828.

action; unless, however, quickly passed through the alimentary canal; but were it to lodge in any part, it would by its continued action produce inflammation; such also in this gentleman's opinion are the effects of calomel. We have long known, that if we excite moderately the mucous membrane by tartrate of antimony, we shall have that long established fact, which two grains or one occasionally effect; viz. increased secretion of the gastro-enteric mucous membrane, alvine dejections and determination to the surface; but on the contrary, inflammation is the consequence of over-excitement, such as is produced by the unknown cause in Cholera, which induces both vomiting and purging. In this opinion Mr. Christie concurs: "the morbid appearances that have been found next in frequency to those already mentioned, are venous congestion in the viscera, particularly in those of the abdomen; dark-coloured blood in the veins, and sometimes in the left side of the heart, and inflammation in some part of the mucous membrane. I have generally found inflammation when present at all, confined to the pyloric extremity of the stomach, and small intestines."

That inflammation, however, is never produced by a continuance of calomel in the stomach and bowels, is sufficiently established by clinical practice. Look to the innumerable cases where calomel has been given in repeated small as well as large doses, as in syphilitic, hepatic, febrile, and other affections, with a view of exciting that very action by their retention, which Mr. Christie ascribes to their rapid expulsion. This is the only modus operandi of calomel, well known to every practitioner in India, who has had any thing to do with Remittent Fever, or complaints wherein the gastro-enteric mucous membranes are affected, and which require to be brought into healthy action with the whole glandular functions; an object so efficaciously resulting on the production of ptyalism, when the alvine and cutaneous discharges are unlocked, and the gastric and biliary juices again flow. Such would not be the effects if the retention of calomel produced inflammation; but mortification, abscess or ulceration, instead of the above healthy diathesis. I am anxious in this place to shew this erroneous conclusion respecting the effects of calomel, since many other gentlemen have supposed that calomel

induces inflammation on the stomach. So opposite is the effect, especially in large doses, that many gentlemen on the Madras establishment objected to the scruple doses, from a belief, that they were too sedative.

Whatever may be Mr. Christie's suppositions, however, on the *modus operandi* of calomel, his practice in the treatment of the Epidemic, which was extensive, proved its efficacy. He remarks: "calomel is certainly one of the most extensively useful remedies we possess for the treatment of this, as well as of various other tropical diseases. From what has been said of the action of calomel in the first part of this essay, it might at first sight appear that, as it increases the secretion of the gastro-enteric mucous membrane, it will be inadmissible in the catarrhal form of Cholera. But it must be remembered, that while it increases the secretion, it also restores it to a healthy condition. The combination of calomel and opium, which has been so much extolled, appears to be a remedy admirably calculated for fulfiling the intentions of cure in the catarrhal form of Cholera; for the requisite properties wanting in the one medicine are supplied by the other; thus calomel keeps up a permanent stimulant effect on the system, which opium does not; opium depresses the abundant discharge from the gastro-enteric mucous membrane, while calomel corrects it; lastly, calomel increases the peristaltic motion of the bowels, and thus effects the discharge of vitiated secretions, while opium relieves irritation." This is certainly new, under the supposition of two medicines having decidedly opposite effects; calomel stimulates, but opium allays that stimulus! He puts a rebel in the bowels; but in case he should excite the constitution too much, the municipal power of opium stands by to quell the disturbance! We need no more affinity, if I may be permitted to use the term, in the operation of medicines, when we can cure by operations the very reverse of affinity.

Mr. Christie observes, that there are two kinds of Cholera. He appears to respect the authority of Hippocrates, Celsus, and Saunders, whom Dr. James Johnson oppugns, and declares there is what is usually denominated Cholera Morbus, or Cholera Biliosa, consisting of an inflammation of the gastro-enteric mucous membrane; the other the Indian Cholera, or Cholera

Asphyxia of Mr. Scot, consisting of a violent catarrh of the mucous membrane generally; and farther, that cases sometimes occur of a mixed nature, from catarrh and inflammation being present in the mucous membranes at the same time. While I am inclined to differ in opinion with Mr. Christie, in considering catarrh to be an integral part of Cholera Asphyxia of Scot, I agree in his treatment, since he allows an inflammatory affection of the mucous membrane, and in consequence admits of venesection, on the principle that it relieves the catarrhal affections of the mucous membranes by diminishing increased action, and restoring the circulation of the blood towards the surface. "How it produces the latter effect is, in the present state of our knowledge, not very evident, but that it does so, is a fact; and that is sufficient."

This concession is very important; and after Mr. Christie's practical observations on the efficacy of calomel and opium, his pathology on the mucous membrane will do no harm, since such reasoning is far better than those subtleties respecting loss of vital principle, and deprivation of nervous energy, the fatal and fragile basis on which Mr. Scot builds his pathology of his Cholera Asphyxia. Unhappily the cold skin, the small pulse, the shrunk features, which are the prominent symptoms of the Epidemic Cholera, have been the cause not only of these erroneous deductions, but especially of the erroneous treatment leading to the use of ardent spirits. It will be remembered, that Mr. Scot observes, that "it is impossible to look upon a patient with this disease without feeling at once a disposition to employ them very largely." True! reasoning from analogy and our feelings; but if such reasoning were efficient, there would be no longer occasion for the study of science, no farther use for clinical experience. When feeling heat in the stomach, our analogy and our feelings would induce us to take cold water; or when under a state of starvation for some days, all we should have to do would be at once to gratify our voracious appetites; or when frozen in the snow for many days, all we should require would be a burning fire. But what does clinical experience say to such treatment? that our feelings and our reasoning from such analogy would be the destruction of life. In differing in opinion with so many talented men, therefore, I trust I have substantial grounds. I am no

apostate from established principles ; for I was the first to shew that the cold skin, the shrunk features, and apparent debility, were a mere scarecrow. I may inquire, indeed, how could debility be effected in a disease which had not existed one hour, and the continuance of which frequently does not extend beyond twelve ; and in a disease from which, when patients do recover, the restoration to health is so rapid, that in one or two days from the attack, they are able to get up and move about ? The effects of debility, besides, are never present as after an attack of Fever, Dysentery, or any other disease, which sometimes lingers on the constitution for years ; effects never known on recovery from Cholera, when it has been properly treated. On the contrary, patients very commonly are quite well the next day, except feeling slightly the effects of the depletion: proof sufficient that Cholera is not a disease characterized by debility.

In Cholera the abstraction of heat is from the surface, and its accumulation is in the internal parts exhibited by the burning sensation about the præcordia ; and instead of direct debility, the strength is slightly affected. Thus there is a broken balance between the heat of the surface and the internal parts ; in the latter there is accumalation of stimulus ; in the former it appears exhausted. But will the cold skin act as sedative on the internal parts, and thus moderate the stimulus ? Clinical practice answers in the negative. For instance, cold immersion in the hot fit of Fever proves that cold acts as a stimulant ; cold on frozen limbs is another proof. Reasoners by analogy, it is true, were wont to consider heat and cold as antagonists ; but science and experience prove that they are only different degrees of temperature. It does not follow, therefore, that the cold skin in Cholera would act as a sedative, but as a stimulant, and add to the inflammatory diathesis, which threatened the constitution ; a fact, which has been substantially proved in the novel, but successful treatment by bleeding in Intermittent Fever by Dr. Mackintosh.

Dr. Mouat, of H. M. 14th foot, narrates the history of the disease*, as it appeared at Berhampore, in Bengal, in March 1828. He opens his account with the melancholy acknowledgment, that though he had witnessed the attacks of this oriental

* Med. and Phys. Trans. Cal. 1829.

scourge for upwards of ten years, and though he had studied it, watched its invasions, contemplated its progress, endeavoured to trace its causes, as well as to alleviate or mitigate its symptoms, yet he found it still the same inexplicable and untractable disease as when he first arrived in India, in 1817. He laments that bleeding, once found successful as a remedy in his hands, now failed entirely. "In former attacks of Cholera, venesection I ever found the most speedy and efficacious remedy with Europeans; and when properly timed, the flow of blood has relieved the vomiting, the spasms, the restlessness, and jactitation, with the great majority. Venesection, in the present instance, has destroyed the powers of life, sunk the patients, and induced spasms and cold sweats! so that where the pulse was feeble, the eyes languid, skin clammy, voice feeble or changed, countenance distressed or shrunk, heat below the natural standard, we have been obliged to refrain from bleeding. In no instance, with any of the above symptoms, however slight or however early in the disease, did the flow of blood either rouse the system, induce reaction, or relieve the complaint." The blood, we are informed, generally flowed freely, but without a rising of the pulse.

I must acknowledge that, from this communication of Dr. Mouat's, I began myself to dread, that Cholera was no longer under the influence of bleeding, &c. until I perceived that he had had recourse to stimulants. "Faintness, exhaustion, cold sweats, with increase of vomiting and cramps, have obliged us to have recourse to stimulants to rouse the vital energies." Here then was the cause of his failure, as well as that of others in innumerable instances, under similar circumstances. Those cases in which the collapse was so early and appalling, I have no doubt were instances of men neglecting to report themselves in time; and hence bleeding and all other means failed. The following remarks would authorize my coming to this conclusion. "In many cases the individual was too ill to give any account of himself; and one could only collect from his comrades that he had vomiting, purging, &c." Hence the cases themselves in many instances could be very imperfectly taken: and it was only after they became convalescent, that any thing like a collected history of their case could be elicited. Even then few could refer their attacks to any

particular cause, though some imputed it to a hearty meal, others to drinking liquor, some to taking a draught of cold water, and others to exposure to the sun, or the chilly damp of the night air."

There is no doubt that many of the men had been in a state of intoxication, when the disease is often long protracted on the constitution before the patient is sent to hospital. I have grounds to urge this on the attention of my readers from the following remarks of Dr. Mouat. "A few days ago, a sum of 15,000 Rupees was paid to the men as commutation for clothing; and the result has been a free and baneful indulgence in all those pleasures, which in this country are ever the source of disease. Most of the sick admitted have either been intoxicated, or labouring under the effects of drinking; and two have already fallen a sacrifice to our Indian scourge, the Cholera, who had previously, and, indeed up to the moment of the fatal attack, been indulging at the canteen."

Dr. Mouat has given us ample tables of his cases and treatment. Concerning calomel and laudanum, he says: "Calomel, in scruple doses, with opium or tinct. opii certainly restrained the vomiting better than any other medicine. Magnesia also in this respect has proved very useful, and seemed to benefit greatly the burning or anguish to the scrobiculus cordis." He has also the following remarks respecting the operation of some other means of cure. "The warm bath exhausted, without rousing the system, and in no case did good; few had strength to go through the fatigue, in the stage, it could benefit; and the subsequent failing of the strength, pulse, and heat obliged us to abandon the remedy altogether; leeches to the head and epigastrium removed local determinations of blood. Mild purgatives to clear out the intestimes, and small doses of calomel and antimony, towards the termination of the disease, were useful; very copious draughts of very hot water were tried, but without benefit." After such evidence, we can scarcely account for Dr. Mouat's use of stimulants, especially when he says, that on dissection there appeared much congestion and vascularity in some cases, and that, on minute examimation, in every case, the vessels of the brain, lungs, liver, stomach, and intestines appeared turgid, and sometimes loaded with blood.

The tables to which I have referred will be found in the appendix, No. I. From them it will be perceived, that there were 93 admissions, out of this number 65 were bled and took scruple doses of calomel, laudanum, and purgatives, and all recovered; the remaining 28 were bled and took stimulants in conjunction with sedatives, and all died, with the exception of seven. These facts speak for themselves.

We now come to the last gentleman who has given to the world his views of Cholera, in a separate form. Mr. Hitchcock*, who describes the progress of the disease on board the H. C. ship *Abercrombie Robinson*, while on the Malabar Coast, in August, 1828, giving his opinion on the proximate cause, observes that "the following appeared among the principal and most remarkable circumstances: a heart oppressed by some invisible, unknown operation, and now sinking beneath a load of dark carbonaceous blood; manifested by a labouring pulse, by a deficiency in the animal heat, and by the colour of the blood transmitted. A brain, chemically as well as mechanically suffering; in part from an important interruption to the change and transmission of the blood from the lungs, as well as from some serious impression made upon that organ itself, by the morbific agent; which effects were most fully evinced by the dilation of the pupil, the sudden giddiness, which ushered in the disease in the first instance, and the stupor, which, without a single exception, was present as the disease advanced. And lastly, the lungs themselves appeared primarily affected, as was seen in the impediment offered to the free circulation of the air, occasioning short and hurried respiration, a purple-coloured lip, and from the appearance of the blood itself, marking an imperfect decarbonisation. These symptoms were ever present in the commencement of the worst form of the disease; and according as they existed to a greater or less extent, was the case rapid or slow in its progress: affording at the same time, a very correct prognosis of the result. But in the milder form the functions of these organs were but little affected, and consequently the case was at once pronounced a favourable one, as they seldom or never changed their character from an excited to a congestive form. Here then," says he, "we have three of the most important parts of the body labouring under a loss of vital and nervous energy;

* Med. and Phys. Trans. Cal. 1832.

produced, I most firmly believe, by some most extraordinary change in the principles of the surrounding atmosphere, or what is perhaps equally probable, from an inhalation of some kind of malignant aeriform particles, which have their rise in a chemical or electrical change in one part or other of the same."

From hence Mr. Hitchcock concludes, that the treatment indicated is to counteract the agent itself which produces the disease, or to employ an expedient directed more especially to the restoration of the nervous and vital powers; and that by such means a general, sure, and favourable termination may be expected, as much as in treating a case where a mineral poison has been lodged in the stomach, to insure a safe recovery from which, the substance itself must rather be decomposed, than that the most urgent symptoms resulting from its action should be palliated or removed by any topical treatment whatever.

Our author describes four cases, in which Cholera manifested itself, but was not noticed by the infortunate individuals until the collapse had supervened to a degree which rendered their condition beyond the aid of medicine. Moreover the cases happened in the night, and consequently had advanced against the unassisted efforts of nature, nothing having been done to arrest the progress, or effect a removal of the disease. "When the two worst cases were brought before me, the pulsation was no longer to be felt at the wrist; the surface had become cold, and covered with a tenacious, clammy perspiration; the lips and finger nails were of a leaden or purple colour, marking the imperfect decarbonisation of blood in the lungs. The pupil was widely dilated, and the white of the eye shown to a considerable extent, from the sinking of the lower eyelid, and from a slight inclination of the ball of the eye upwards. The respiration was greatly embarrassed, and the whole powers of life seemed rapidly escaping. In these, as in several of the worst cases that followed, the spasmodic affection of the lower extremities was very inconsiderable; the stomach, however, had not lost its powers, for it rejected most forcibly any fluid that entered it. The venous blood in the cuticular branches strongly confirmed the presence of carbonaceous matter, and appeared, when extracted, to have lost a great deal of its vitality

or healthy character; or had otherwise undergone a most serious change, being of the consistence and colour of molasses or tar."

To relieve these symptoms, we find Mr. Hitchcock falling into the common error of using stimulants, on the principle that the indication of cure consisted in the restoration of the nervous and vital powers. He gave hot brandy and water with laudanum, scruple doses of calomel, and the hot bath, and applied sinapisms. But what was the result of such treatment? Mr. Hitchcock observed, that instead of the powers of life being affected through the medium of common diffusible stimulants, the stage of collapse continued, and a few hours put an end to the sufferings and existence of the patients.

We must do Mr. Hitchcock the justice to say, that no remedy would have been successful in treating such protracted cases: the constitution had evidently sunk too far for any medicine to affect these fatal terminations, which however at once confirmed the existence of a most powerful and destructive disease. Mr. H. therefore now made arrangements for preventing or warding off its further attacks. Accordingly, the next cases which appear are met on the first attack, and are treated also on very opposite principles, and terminate in a very different way. He says, that the symptoms began with giddiness and head-ache, frequent purging and vomiting of a watery fluid, spasmodic pain about the stomach and bowels, with cramp in the lower extremities; and that these symptoms were attended with great thirst, restlessness, and anxiety, though the pulse was generally somewhat quickened and expanded. The skin had not become cold, for the perspiration was upon it; the surface was warm, and the powers of life in this the first stage had not become so embarrassed. Hence he observes: "In the cases now under consideration, the extraction of blood was productive of the happiest effects; which being accomplished, say to the amount of 20 or 30 ounces, the head-ache, giddiness, and pain about the stomach and bowels, were greatly relieved. A scruple or fifteen grains of calomel, with one or two of opium, was next prescribed, with a draught of æther and camphor mixture. These medicines were repeated two or three times in the course of twelve hours, and, with frictions of turpentine, never failed to allay the vomiting and purging, and to remove the

cramps from the muscles of the lower extremities. A copious diaphoresis very generally made its appearance after the first dose, and a discharge of bilious fæces followed in the course of a few hours, which afforded considerable relief and proclaimed the convalescence of the patients. On the second day, in these milder forms, I gave small doses of a weak infusion of quassia and camphor mixture, prescribing occasionally as necessity might require, a gentle aperient. If any thing like numbness or giddiness continued, then a blister of cantharides was applied to the nape of the neck. This treatment so thoroughly succeeded, that in a few days the men resumed their duty, without any great debility arising from the loss of blood, or inconvenience from the large doses of calomel they had taken."

PART III.

DIGEST OF THE REPORTS

OF THE

MEDICAL OFFICERS OF THE BENGAL, MADRAS, AND BOMBAY ESTABLISHMENTS,

WHO HAVE TREATED THE DISEASE BY STIMULANTS.

SECTION I.

BENGAL REPORTS.

I PROCEED to examine the Reports furnished by the medical officers at the three Presidencies, commencing with those of Bengal, in which the same train of reasoning with that of Dr. Johnson, has been followed with very little variation. This will best decide to what extent clinical experience supports that hypothesis of the proximate cause.

I shall first give the substance of the Reports from the gentlemen at Nagpore, where the greatest failures took place in the treatment of the disease; but before I notice the Reports and the cases communicated, I shall quote some important remarks from Mr. Dyer, the superintending surgeon. In his letter to the secretary of the Medical Board, dated 30th June, 1818, he observes that the force in which this great mortality had taken place was marching when the disease appeared. "The troops had undergone an uncommon degree of fatigue and exposure, during the whole of the hottest months of the year. For 12 days they were unavoidably before Chandah, on duty, without tents, and on picquet, or in the open batteries, without shelter of any sort. Both Major Gorham and Mr. Davies fell victims to the effects of their tour on duty in the batteries, during the whole of the day of the

19th; since which the troops have been constantly marching. The drought of the men even at night, or early in the morning, was excessive, and there was no restraining them from taking their fill of water, when they came to wells and nullahs, *and a few almost sudden deaths in consequence occurred.*"

Having thus ascertained how the Army was situated, it will also be important to notice the following remarks, which are of too great consequence not to be impressed on the minds of my readers. "During the days and nights," Mr. Dyer observes, "of the 30th and 31st ultimo, the cases of Cholera Morbus were most distressing and melancholy to witness, *either a turn for the better or lifeless in six or eight hours.*"

My readers no doubt recollect that paragraph in my letter, which states, that unless this Epidemic is arrested on its first attack, the hopes of being successful in our treatment is vain. The following is the paragraph to which I allude. "*I am of opinion, that unless a patient takes these remedies within six hours* after the attack, the case is hopeless; at least I only recovered ten patients with the regular form of the disease, after a greater lapse of time, and in those the symptoms were particularly mild." Mr. Dyer's statement affords evidence of the suddenness of attack and death, and that the failure of the remedies recommended by me, was owing to the lapse of time *which had intervened from the commencement of the attack and the administration of the remedies;* and where this lapse had not taken place, there is sufficient evidence of their unexceptionable success. We might, indeed, expect that immediately on the appearance of the disease, in a marching force, the first cases would be protracted; for let it be remembered, that when this disease first appears in a town, or camp, patients are panic-struck. In the former, distance of residence from medical aid; in the latter, being on picquet in the batteries, or on guard duty, are always ordinary occasions of delay in reporting the sick; on the arrival of patients, therefore, they are in the last stage of the disease, especially when it is so virulent as Mr. Dyer describes it to have been with this force, proving fatal within six or eight hours after the attack, unless arrested by medicine. Our surprise cannot, therefore, any longer be excited at the want of success in removing a disease, in which

so few hours elapse before dissolution ensues, if the main part of so short a period is allowed to be spent by the disease, in exhausting every vital function. Such then appears to have been the case in the force at Nagpore. Medical gentlemen there, finding the exhibition of the means recommended by me, fail in effecting a cure, lost all confidence in their efficacy, threw them at once aside, and substituted others.

The nature of the disease, as it appeared in this division of the army, is thus described by Mr. Jameson, the secretary of the Medical Board on the Bengal establishment, in his summary of the reports from the medical officers of this Presidency. "When the Epidemic first broke out in the Nagpore Subsidiary Force, the attacks were so exceedingly virulent, and the irritability, spasm, and universal depression, so violent, as to be *quite beyond the reach of art.* The fate of the patients was so quickly decided, that of the seventy or eighty brought into hospital in the course of the first day, more *than ten were found dead, or in the act of expiring in doolies.* In such terrible examples of the disease, it was vain to try to bleed; there being no pulse at the wrist; and *arterial action was so completely gone,* that the heart had no power to propel the *blood from the centre.* By the unanimous consent of the whole staff of the division, calomel was reprobated *as injurious in every case and form.* In whatever *way given in repeated scruple doses, with or without other aid; washed down with fluid, or dry on the tongue,* whilst fluid of every sort was denied to the sufferer, still it was immediately thrown up, and invariably added to the irritability of the stomach."

Nor is it astonishing, that such were the effects of the disease, so virulent in this protracted state, resisting every remedy that could be administered.

"At Mooltye and Hussingabad," continues Mr. Jameson, "when the Epidemic attacked detachments of the same body of troops, calomel, when given alone, was conceived to allay the irritation of the stomach, and urgent thirst; and even in fatal cases to afford much relief."

And I will venture to say the cause of the efficacy here was, that the cases were not so protracted; but be this as it may, the gentlemen of the Nagpore Subsidiary Force would no longer

confide in the sedative effects of large doses of laudanum and calomel; but reasoning from analogy, that there was want of excitability, they adopted the use of stimulants. It is now my duty, therefore, separately to examine their reports, and their success, as the best proof of my impartiality.

Mr. Rind commences by describing the inefficacy of large doses of calomel and laudanum; and proceeds to observe: "In lieu of this, I employed a mode that appeared to me far more rational, viz. to allay the vomiting, *increase the heat of the body*, and procure a copious stool. For this purpose, I gave pulv. jalap. comp. ʒi. calomel gr. viii. washed down, with some *hot* brandy and water; and repeated the brandy and water, in small quantities, and at short intervals, till the natural heat of the body was restored. If the jalap would not remain on the stomach, I gave a *small* dose of laudanum, and what was still better, the opium in a solid form; and shortly after, repeated the compound powder with the calomel." The result of Mr. Rind's treatment was—that out of 17 admissions, 13 died.

Mr. Woodburn reports, that calomel, essential oils, brandy, and opium, followed up by purgatives, are the medicines which he has principally depended upon. We are not unfortunately in possession of any case from this gentleman, we cannot say therefore at what period his stimulants were administered, but we should believe they were given judiciously, as his admissions were from 12 to 13, out of which three died.

The report from Mr. Cooke, is accompanied with cases. This gentleman having, with his colleagues, mentioned the failure of my remedies, thought it justifiable to try something else. "As many of my patients," he says, "complained of the *taste* of the laudanum, which was thrown up again instantly, I *substituted* warm *brandy* and water in equal quantities, of which I gave a desert spoonful every ten minutes. This I found to be *more efficacious* in allaying the irritability of the stomach than laudanum and oil of peppermint. To those patients whose skins were very cold, I gave *plain brandy*, which was generally successful. The brandy and water, given with or without calomel, answered *equally* well."

The first case is a European; he takes 60 drops of laudanum, oil of peppermint 20 drops, water one ounce, calomel

one scruple, this was to be thrown on the tongue, washed down with the above draught; to be repeated every half hour during the night, and his extremities to be bathed in warm water every hour.

My reader's surprise will not be less than my own has been, on reading so extraordinary a prescription as the above; repeated unconditionally every half hour. It is mentioned, that the patient was admitted in the evening: supposing 8 o'clock, by 6 on the following morning three drachms and one scruple of calomel, and not less than ten drachms of laudanum, must have been swallowed; add to this, he had pediluvium every hour. The next morning we find that the patient is *no better*, but that his skin is cold and clammy; he is therefore now ordered *one hundred drops* of laudanum, with 20 of peppermint, in one ounce of water, given with ten grains of calomel *every half hour;* a blister applied to the abdomen, and an enema of congee, containing *half a drachm* of laudanum thrown up and retained for four or five minutes. Half a drachm of laudanum by enema, and one hundred drops in a draught! Noon arriving, our patient does not improve; on the contrary he becomes much worse, with prostration of strength, and coldness of the body increased. He now has another 100 drops of laudanam, with thirty drops more of peppermint, and one ounce of alcohol, in half an ounce of water.

If any thing can be, this is an utter disregard to affinity of operation in medicine; a sedative dose of laudanum combined with a most powerful stimulant! He is to have 10 grains of calomel also every *half hour*. The enemas are likewise to be continued with a warm bath. At 6 in the evening, the vomiting becomes excessive; spasms in the extremities and abdomen, *great prostration* of strength, coldness of the body; blister not drawn. It will be sufficient to add, that the treatment continued the same, saving that brandy was substituted for alcohol. The patient lingered out till the morning, when he died.

The third patient is admitted at noon of the 3rd, the same medicines are prescribed; but on the following morning the skin being cold and clammy as that of the former patients, these excessive doses of sedatives, tending doubtless to produce such an effect, are prudently discontinued. He is desired to take, therefore, warm brandy and water, in small quantities, which raises the system

from the extraordinary reduction it must have experienced under the influence of such an unprecedented quantity of laudanum and calomel. Nothing more was done to this man, except the immersing him in a warm bath occasionally, and the opening of his bowels, by a dose of jalap. He accordingly recovers.

The third case is a European, admitted in the afternoon. The same medicines are administered ; but on the following morning, there being much spasm, the patient is bled 24 ounces; the effects are thus described, *spasm of the extremities less frequent ; pulse fuller since the bleeding ;* the calomel and laudanum are very properly omitted, but twelve ounces more of blood are abstracted ; the skin being cold, warm brandy and water are given in small quantities, every ten minutes.

In the evening, it was found that all other symptoms were relieved by bleeding, but that the retching and thirst had not abated ; and the patient complaining of an acute pain about the navel, a blister was applied to the part. It was exceedingly unfortunate, that Mr. Cocke kept up that excitement by brandy and water, though in small quantities ; it is probable that it induced the retching and thirst. How much better would it have been to have allayed the irritability of the stomach by mucilaginous drinks ! Besides the application of the blister, the patient was now plunged into a warm bath. Strange to say, however, Mr. Cocke orders at the same time tea-spoonfuls of pure brandy to be given. What opposite modes of treatment ! Blistering, bleeding, and stimulants ! The latter given too, when the patient is complaining of acute pain about the navel, which was certainly indicative of the very opposite remedy to that of brandy. We find, two hours afterwards, the retching continues excessively, nor is the thirst abated ; the brandy is, consequently, prudently omitted ; the blister having drawn, the pain is relieved ; he now sleeps some hours, and a purgative of jalap is administered ; the bowels are opened, and the irritability of stomach ceases ; on the following day the purgative is repeated, and an alkali given to quench thirst ; from this day, our patient becomes convalescent, and eventually recovers.

These two last cases of Mr. Cocke's were incontestably cured by sedatives, at the same time affording a powerful evidence against the use of stimulants.

The next patient was attacked at twelve at night. Mr. C. did not see him till half past five in the morning. The treatment was the same as the preceding, with the exception, that the patient was not bled, but took a mixture composed of alcohol ʒ i. aquæ bull. ℥ i. tinct. opii gtt. 100, ol. menth. pip. gtt. xxx. ; a desert spoonful was directed to be given every ten minutes, which would be one ounce of alcohol in one hour and 20 minutes. The man died.

The fifth case which Mr. Cocke communicates is that of a Sepoy. He takes sixty drops of laudanum, and twenty of peppermint, in four drachms of brandy ; this was to be given every half hour, with five grains of calomel, but the vomiting and spasmodic affection of the limbs not being relieved, the thirst being great, and the pulse small, with cold and clammy skin, it was found advisable to change this prescription ; unfortunately we do not know the hour when the patient was admitted, so that we cannot tell what quantity of laudanum was administered. We observe an astonishing fact, however, that he was directed to take two drachms every hour ; the prescription is dated the 2nd, and it is not changed until the 3rd ; so, supposing, he had taken it during the whole of the night, he must actually have swallowed three ounces of laudanum ! the violent excitability of the disease, aided by the brandy, having counteracted its sedative effect. On the 3rd, one grain of opium with two of asafœtida was to be given every half hour, with simple warm brandy and water ; the opium now takes effect ; on the 4th and 5th, he is purged with jalap, combined with calomel, and recovers. The next patient takes six grains of calomel, every half hour, washed down with brandy and water ; and a blister is applied to the navel : he is afterwards copiously purged with jalap, and recovers.

The report of Mr. Mercer is in a letter communicated to Mr. Dyer, the superintending surgeon. It would appear from the tenor of Mr. Mercer's remarks, that the superintending surgeon was averse to the administration of calomel ; he observes : "From an examination of my cases, I am afraid you may think I have been rather free in the use of calomel ; however, it was only in those more violent attacks of the disease that I gave it so largely. I believed it might be beneficial in allaying the irritation of the stomach ; and would in some measure counteract the constipating

effects of the laudanum." Here follows a detail of five cases: The first was a Sepoy; he was directed to be covered well with blankets, and to take 80 drops of laudanum, with 20 grains of calomel, every two hours: also to have brandy and spice mixed. It will be perceived by my readers, how diametrically opposed this prescription is, to my reasoning on the modus operandi of calomel and laudanum. In large doses, they, in my description, act as sedatives, but the gentleman now prescribing, could not have entertained this opinion; he therefore is following the course suggested by Dr. James Johnson, and adds stimulants, such as brandy and water with spices. At 4 P. M. it was found that these remedies, on reaching the stomach, had been rejected; an event not at all surprising. The stomach already over-excited, would necessarily become more so by being farther irritated by stimulants. The dose of laudanum is therefore increased to 100 drops, and given immediately with the calomel; *the brandy* is continued as before. 5½ A. M. every thing received into the stomach is rejected; 6½ A. M. died.

The next patient—"Let him have immediately 100 drops of laudanum, with 20 grains of calomel, and in a short time afterwards ℥ss. of *brandy*, with water and spices, to be repeated every two hours and a half; let him also be kept warm." Evening—"all his medicine has been rejected; gave an enema immediately of 100 drops of laudanum, in a pint of congee, to be repeated every four hours; the calomel and *brandy to be continued*." Next day—"nothing relieved. *The pain in his liver is greater than before; he has rejected all his medicine.* Let a blister be applied on the region of the liver; omit the enemas, and continue the calomel and laudanum as before; 12 A. M. the pain in his liver somewhat relieved; what he drinks is constantly rejected. He will drink freely of water gruel and have a purging *enema*. *Omit the calomel and laudanum*, but continue the brandy*. Evening—*vomiting* continues, skin cold, and covered with a clammy sweat; fruitless is the endeavour to excite to the surface by stimulants." On the following morning, the patient died.

The third patient—"Let him have 80 drops of laudanum, with 20 grains of calomel every two hours and a half, with occasional

* Although the pain in the liver had required the application of a blister.

doses *of brandy and spices;* at the same time let him be covered with blankets. 6 P. M. has rejected his medicine, and is nothing relieved. Rept. med. 8 P. M.; again rejected his medicine; let him have an enema of 150 drops of laudanum, in a pint of congee, and to be repeated every four hours; continue the doses of calomel, and the brandy as before." Next day,—is nothing relieved, appears very exhausted*. Let a solution of opium be kept constantly applied to the region of his stomach by means of cloths, and continue the same remedies as before." At 11 P. M. died.

The fourth patient, treated the same way, died in the course of four hours; the disease having made considerable progress previous to the admission of the patient.

The fifth patient also died under similar circumstances.

In the report from Mr. Ogilvy, his treatment is exhibited in the single case he communicates, which I will quote, as this appears to have been the only gentleman in the Nagpore force who used my remedies uncombined with stimulants. "Mahomed Esoph, Ætat 20, (June 1st, 6 A. M.) was suddenly seized early this morning with pain and tension in the region of the stomach, griping and uneasiness in the bowels, which were soon afterwards succeeded by vomiting, and purging of a thin watery fluid, and spasms in the abdominal muscles: at present, features much shrunk; skin of the extremities cold and clammy; debility; pulse extremely small and feeble; abdomen collapsed; much thirst; general uneasiness; tongue dry, pretty clean. He prescribes hyd. sub. xxv. gr. to be given with tinct. opii gtt. c. and ol. menth. pip. gtt. xx. in one ounce of water. Fomentations to the abdomen. 12 A. M. has had no vomiting since the morning; many stools of a whitish appearance; no intermixture of fæces; pulse about 70, *and extremely small, and some pain in the scrobiculus cordis on the application of pressure; skin still cold and clammy;* cramps in his hands and legs; contin. calomel et tinct. opii; descendat in balneum calidum."

Here is still a cold clammy skin, a pulse scarcely perceptible, yet this gentleman gives no stimulants; he still perseveres, on the contrary, in the use of sedatives. This was not reasoning from analogy; but this is clinical deduction. We find him pressing the

* How fruitless such a system!

scrobiculus cordis and discovering that pain is produced in consequence. No, says this practitioner, here is irritation, I will not add to it by giving stimulants, but I will endeavour to allay it by sedatives. "2 P. M. has had several thin dejections of a greenish appearance ; no return of vomiting; pulse *more easily felt.*"

Here is an effect, and from sedatives too ; "pulse more easily felt," allaying the excitability, has roused the vital functions ; but let us proceed and mark the effects :

"And the temperature of the surface more natural, cramps considerably relieved after the bath, as well as the pains of the scrobiculus cordis ; *no spasms of abdominal muscles ;* slept a little. Omit calomel. tinct. opii habeat. pulv. rad. jalapii ʒ iss."

What will the supporters of exhausted excitability say to this ? The skin becomes warm, under the effect of sedatives ; "6 P. M. 4 greenish stools, with some admixture of fæces ; slight return of the spasms in the hands and lower extremities, producing a considerable degree of pain. What does our practitioner give ?" Stimulants ? No, "Capt. h. s. tinct. opii gtt. lx." Let us mark the result. "June 2nd, *slept pretty well* during the night; several evacuations by stool principally consisting of a fæculent matter, and of a more natural colour ; no spasm ; *pulse and skin improved.* Capt. ol. ricini ℥ i. vespere ; four or five fæculent stools ; complains of nothing ; but debility. 3rd, continues to improve ; stools nearly natural ; has had occasional doses of some purgative medicine until the 6th, when he was discharged."

The next report is from Mr. Garden. This gentleman observes, that the patients "when in the most perfect health, were suddenly attacked with a severe vomiting and purging ; a sense of tightness *and violent burning heat about the stomach,* extending along the diaphragm *as far as the throat, and producing a constant desire* for *cold* water."

What, it may be inquired, are such symptoms, as the above indicative of—want of excitability ? Burning sensation and unceasing thirst, indicative of want of excitability ! such symptoms indisputably exhibit a stomach under a high state of irritability. "The cold water was no sooner drank," continues Mr. G. "than he vomited again ; severe spasms of the muscles of the feet and legs, gradually affecting those of the abdomen, chest, and upper extre-

mities; great and sudden prostration of strength; countenance much collapsed, eyes suffused, sunk in their sockets, and surrounded with a livid circle; *pulse imperceptible, both at the wrists and temples; skin cold and covered with a clammy perspiration.* For the first few days, the attacks were *so sudden and unexpected, and the above symptoms so violent, that by the time a patient was brought to the hospital his strength was so completely exhausted, that medicine had no time to produce any effect; and he generally died within five hours from the commencement of the attack.* Large doses of calomel with laudanum and ol. menth. pip. were *given at first, but being seldom retained on the stomach; and when kept down, not producing any immediate effect, while the patient* was rapidly sinking, recourse was had to *brandy and other stimulants.*"

I may inquire, whether in such cases it could be reasonably expected, that any medicine would prove remedial; but such was the trial at Nagpore, which sedatives received, and such was the principle on which the introduction of stimulants was admitted.

A case is now given of the disease attacking a European, already under the influence of mercury; he took one hundred drops of laudanum in congee, frequently by enema, and a blister was applied to the stomach; a pill of three grains of opium was washed down with a *little brandy* and *water;* strength not mentioned; but this is treating by sedatives; the patient being already under the influence of mercury. Let us look to the result. The "vomiting and watery purging stopped; a dose of p. j. brought away a large quantity of dark-coloured offensive fæculent matter; from which time, the patient rapidly recovered."

Six days had not elapsed from the man's discharge from the hospital, when probably from some imprudence he returns with a relapse; the treatment is not mentioned; but he dies.

One case is given by Mr. Evans. On the 1st day, the patient took 20 grains of calomel, with 80 drops of laudanum; although he had a restless night, he had no return of vomiting and purging, but complained of *the burning sensation at the scrobiculus cordis**. Calomel is next ordered, with occasional

* With what view could the brandy be here prescribed to assuage the "burning sensation of the scrobiculus cordis?"

draughts of weak *brandy* and water; also powder of jalap. The patient died.

Having thus minutely examined the Nagpore reports, I shall now proceed to notice those from the Superintending Surgeon (Mr. Reddie) of the left division of the army; a force which approximated to that at Nagpore. This gentleman observes: "Bleeding was employed in some instances, but without benefit; a selection of, and discrimination in the mode and time of applying the few available means, seemed to be now the only points demanding attention. *Stimulants* and *anti-spasmodics* were named, ammonia combined with *alcohol*, sulphuric and nitrous æther, essential oil, aromatics, spirits, and wine were given. Calomel in large doses, and at short intervals, on the least revival, succeeded by purgatives; and in cases of extreme irritability of stomach, I have suggested the rapid salivation of the system by fumigation, with cinnabar; glysters in spite of the utter aversion of natives were occasionally resorted to, but no beneficial result was observed. Frictions with warm oils, and liniments, fomentations, dry heat, and blisters were used." The result of this treatment, communicated by Mr. Reddie is, that Mr. Allen had only six cases in the 1st Battalion 14th Regiment, (which corps had been encamped in the vicinity for some weeks,) two of which terminated fatally, soon after admission; and 15 of the Mahratta contingent horse, of whom 3 died, after he had received charge.

Mr. Irving had admitted eight cases, two of which terminated fatally. In the 2nd Battalion 28th N. I. the disease was peculiarly severe; 17 men had died "on one day; five cases were admitted, all of whom died in a few hours. Two or three days elapsed without any recent case; then two or three came in daily, proving fatal in five or six hours."

Thus we have a melancholy proof of the erroneous system of combining stimulants with calomel, opium, and purgatives. In another report of Mr. Reddie's, we find that he suggested a different mode of treatment. He observes, "I beg permission to add that I have had the satisfaction of *witnessing a favourable result* from the adoption of the treatment I urged in the case of the 28th by Mr. Allen. In some recent cases of the 1st Battalion 14th

Regiment, blood has been taken to the extent of 16 ounces, and after two full doses of calomel, 40 to 60 grains had been retained on the stomach; cathartics were immediately given and continued at short intervals while opiates and *stimulants of all kinds were withheld,* and mild diluents *used* freely." "The blood shewed no buffy coat, and was rather loose in texture; the pulse has not risen immediately, but in the course of an hour an evident mitigation of symptoms has appeared, and the amendment been gradual."

The following is addressed to Mr. Reddie, by Mr. Charles Ray, whose opinions are very similar to Dr. Kennedy's, on the proximate cause of Cholera. He observes, that "the symptoms would seem to indicate that the sensorium is the principal if not the primary organ affected in this disease, as in Intermittent Fever, or to what are we to attribute the great oppression of the vital functions, at the very commencement of the attack? The great prostration of strength, and depression of spirits, the diminished circulation, and its consequences; the sunken features; the spasms or cramps in the body and limbs, as well as the cold extremities, and cold sweats over the body, all seem to denote either a deficiency, or irregular distribution of the nervous energy arising from some unhealthy impression on the brain. The existence of vomiting and purging with some of the other symptoms, has given rise to the prevailing opinion, that this Epidemic is occasioned by particular kinds of poison.—These symptoms, *if we may judge by analogy,* do not appear incompatible with the cause here assigned, the sensorium being the primary organ affected; in concussion of the brain for instance, vomitimg is a common symptom, as it is in the commencement of Fevers, and there may be something peculiar in the nature of the effluvia which occasions this purging, in the same unaccountable way as marsh miasma induces a return of Fever every second or third day; still, however, the symptoms of this complaint are so nearly allied to those arising from poison, or acrid substances taken into the stomach, that no wonder such a variety of opinions should exist as to its cause."

From this *reasoning by analogy,* it was Mr. Ray's rationale in the treatment, to excite the brain: besides bleeding and large

doses of laudanum, therefore, *he gave arrack* to produce a slight degree of *inebriation*. The effects of his treatment are thus mentioned, " My reports will unfortunately prove, *that I have not been* very successful in the treatment of this terrific desease."

The following remarks are valuable to shew the benefit derived from bleeding :

" Those, whom I saw at the commencement of the attack, and whose pulse would allow it, were bled, and I think with benefit. *Such was the confidence of the Sepoys, after seeing a few who had recovered after this operation had been performed, that all indiscriminately requested to be bled on their admission into hospital, and were generally indulged ;* immediately afterwards a dose of laudanum from 100 to 150 drops was administered, either by itself or *combined* with large doses of calomel."

This is a treatment that in all diseases of an inflammatory diathesis would be applicable, especially in cerebral affection, where it is essential to allay great irritability, when purgatives have a wonderful effect ; but I have no doubt, however, in the detail of treatment, my readers have shared in my surprise that purgatives should have been so generally and unaccountably overlooked.

Mr. Nicoll reports, that " a detachment from the 2nd Battalion 5th Regiment N. I. and corps of Local Cavalry have suffered very severely from Cholera Morbus. Two havildars and nine Sepoys of the former ; and one subadar and a bheestee of the latter have died."

The following is described as the treatment : " a scruple of calomel was immediately administered and washed down with 80 drops of laudanum ; frictions on the abdomen, with the *internal use of stimulants were ineffectual, and the patients died* after having been ill from five to six hours."

Our next *report* is from Mr. Hardtman who mentions that his treatment consisted in immediately administering twenty-five grains of calomel, with eighty drops of laudanum, and about one ounce and a half of brandy in a little water ; and he repeated these, at intervals, and in such quantities as appeared to be indicated by the urgency of the symptoms.

It however appears, that at first Mr. H. had doubts about using brandy ; and from the following extract of a letter addressed

to Colonel Lyons, it may *be supposed* that he did not combine stimulants with sedatives:—"I am doubtful that brandy is necessary or *even* a proper *medicine* at the very commencement, although it certainly is in the second stage of the complaint*." The following remarks are worthy of notice.

"The alternation of vomiting with purging, in the regular Cholera, following each other with such rapidity as almost to become simultaneous, did not take place in this disease. On the contrary, it struck me, that the stomach and bowels were very unequally affected: for instance, those who suffered most from vomiting were less troubled with purging; and vice versa, those who were most purged suffered less from vomiting. The vomiting also had nothing bilious in its appearance, and frequently flowed out of the mouth without any convulsive efforts, the same as it sometimes does out of a child, whose stomach has been overloaded, or a man's, who is very much intoxicated. In fact the state of asphyxia, which sometimes ensued, and the apparent cessation of all vital power, with the contents of the stomach, flowing out of the mouth in this manner, would almost have inclined a person, unacquainted with the cause, to believe that the patient was really drunk."

Mr. Hardtman had 76 admissions, out of which twelve died.

Mr. Keys, the superintending surgeon of Berhampore, alluding to the prevalence of the Cholera at that station, observes, that there were four cases of Cholera, *two* of whom died under the usual stimulative and anodyne treatment. He then goes on to state the therapeutic effects of spts. terebin. combined with laudanum; but as the following observations shew that the efficacy of this medicine was uncertain, I will not detain my readers by quoting this part of the Report.

"I confess, however, that we have not had cases sufficiently numerous to establish the superiority of the terebinthinæ, or to give it publicity at present, until farther experience confirms its efficacy, of which the Board will have due notice†."

* What must have been this gentleman's idea of the proximate cause?

† My readers will find in other parts of this work, that this medicine has only in a few instances proved efficacious.

Our next report is from Mr. Thompson. He commences by stating a disheartening result, that out of 17 cases treated with large doses of calomel, laudanum, *volatiles*, and *stimulants*, only four recovered. He was induced therefore to try a plan which was not stimulant; viz. emetics and antimonials, and he appends four cases to evidence the efficacy of this treatment. Before I quote one of them, however, which I shall do as a specimen of the rest, I must draw the attention of my readers to the pernicious operation of stimulants, which the preceding remarks testify; and shew that the efficacy of the medicine in the following cases is not ascribable, as Mr. T. has supposed, to the operation of the emetic powers of the ant. tart; but to the effects of that medicine on the bowels and determining influence to the surface, aided by infus. sennæ, calomel, jalap, and pulv. antim. The doses of the tartarized antimony were too small, and given at too long intervals to produce the effect which this gentleman desired, and the vomiting which occurred was the effect of the disease, more than the medicine; but I will quote a case complete, by which my readers will be convinced that the modus operandi of these remedies was to counteract an inflammatory diathesis, and to determine to the surface, and hence effect a cure.

"Case 1st, Jhaleem (sepoy), age about 27, spare habits, but subject to no particular complaint, was brought to hospital at 11 A. M. 18th Dec., says, that he first felt unwell on the 16th; present illness commenced this morning, with violent purging of thin congee-coloured stuff: retching soon followed; these symptoms continue in full force—eyes sunk—pulse scarcely preceptible—skin cold and clammy, extremities cramped, great thirst, burning sensation about the epigastrium, belly distended and painful to the touch; constant cry for cold water; tart. ant. g. i. every 15 minutes, till full vomiting is procured. 12 A. M. second dose, vomited copiously*. Much undigested rice and dhall discharged, sour and offensive; pulse the same, cramps less severe, one watery stool; tart. emetic gr. i. to be repeated. ½ past 12 A. M. three severe fits of vomiting from 3rd dose; more undigested food thrown up; expresses relief from the vomiting; another watery stool. 2 P. M. vomited once since last report; some yellowish green stuff discharged. Thirst

* From two grains tart. antim.!

more moderate; pulse more distinct; one stool; cramps bearable. Tart. antim. gr. $\frac{1}{4}$ every half hour; warm water occasionally. 6 P. M. pulse improving; has taken the medicine regularly; vomited twice; several bilious offensive stools; heat pretty general; annoyance from cramp trifling; pain in the stomach and heat in the bowels considerably relieved; medicine to be continued in the same doses. 9 P. M. tart. emetic has been given three times; several reddish stools; frequent nausea, but no vomiting: appears languid; pulse distinct. Tart. antim. in half the quantity to be given occasionally during the night. 19th September, feels easy; took medicines four times: four stools of some reddish offensive stuff; vomited twice; pulse feeble and distinct. Tart. antim. omitted. Infus. ging. and congee for drink. 2 P. M. continues easy; no vomiting or stools; calomel gr. x. pulv. antim. iii. pulv. jalapii. g. x. every two hours till three or four copious motions are procured. 21st, 6 A. M. three doses, purged copiously; countenance chearful; pulse good; makes no particular complaint; bowels to be kept open with infus. chareyta and senna. 23rd, convalescent; discharged in January."

Having drawn up four cases, all of which are similar to the above, Mr. T. observes, "whenever an opportunity occurs, I shall certainly have recourse to this mode of treatment; the successful termination warrants farther trial. I have *heard of its having failed in many instances*, but this has been the case with almost every medicine that has been used in Cholera."

The next report I shall notice is from Mr. Featherston. He observes, "On proceeding up the river, I had charge of a detachment of Europeans, in which Cholera made its appearance. On the 27th October, preceded by rain, a sudden change of wind from the east came on, which continued with us until the 4th of November, when eleven cases of Cholera occurred. The first was treated with large doses of calomel and opium, *brandy* and water, and friction; *he died in a few hours;* the irritability of stomach was very great; any thing swallowed, *particularly brandy*, appeared to *increase the violence of the spasms of the chest and extremities.* On dissection, the *villous* coat of *the stomach was found of a scarlet colour; so highly injected were the arteries that it resembled a piece of cloth; the small intestines and peritoneum,*

lining the back part of the abdomen and omentum, exhibited strong marks of arterial congestion ; the head was not opened, but I have no doubt considerable inflammation existed, as he was comatose in the intervals of relief from spasm. Mr. Featherston had now seen enough of the error of giving stimulants. He remarks, " *In* the succeeding ten cases on the river, *I abstained from the use of spirits ;* in the severest, I opened several veins ; and procured a discharge of two or three ounces of blood, which I always found to give relief ; on the return of spasms, a second bleeding to the amount of 3 or 4 oz. was followed by syncope, and still greater relief. The plan succeeded with the aid of scruple doses of calomel, and two or three grains of solid opium, repeated every two or three hours, until a better state appeared."

Our next report is from Mr. Superintending Surgeon Russel. The first case is a European in H. M. 59th Regiment. " Immediately on his admission, about 16 ounces of blood were with some difficulty obtained from his arm ; whilst the blood was flowing, he was put into the warm bath, and had ℈ i. of calomel given him, and on his being replaced in bed, bottles of water were applied to his feet, and his belly rubbed with laudanum, and liq. ammon. carbon. He now appeared more composed and rested pretty quietly, with the exception of the pain in his head, which did not leave him, and one or two watery evacuations downwards, till ½ past 11 A.M. when the spasms again attacked his legs, and the vomiting returned ; a drachm of tinct. opium, was given him, but as he vomited shortly after, the same quantity was repeated at the interval of half an hour. Dr. Thomason, who attended, saw him again at ½ past 12, and could feel no pulsation at the wrist ; the hands were cold, and he seemed in much uneasiness, turning constantly from one side to the other ; 50 drops of tinct. opii with a drachm of liquor. amm. were given him ; and desired to be repeated every half hour, diminishing the quantity of laudanum 10 drops each dose ; at the same time the friction of the belly was ordered to be continued, and a small quantity of spirits to be given every now and then. 2 P. M. he was evidently worse, eyes more sunk, extremities cold, apex of the tongue getting cold ; he was again put in the warm bath for 5 minutes, and a glyster of spirit. terebinth. was exhibited, and another scruple of

calomel given, and small portions of *spirits every quarter of an hour*, *but without any benefit*, for he expired about 3 P. M."

The next case was of a woman, which was also fatal. Mr. Russel remarks, that "she was a patient of Mr. Reynold's, who did not, on first seeing her, appear to have been aware of the nature of the disease; there will be no occasion to quote it; she took calomel, laudanum, ammon. &c. The next case is a European, treated *without stimulants*, but solely by sedatives; admitted on the 2nd of April, at ½ past 9 A. M. with cramps in his arms and legs, pain across his stomach, with spasm of the muscles of deglution, pulse small and quick; was taken ill while in church this morning; was bled to 30 oz. put into the warm bath, and ℈ i. of calomel given; became faint after he was bled, and perspired freely; extremities became warm after a few minutes, cramps however recurred, when 40 drops of laudanum were given, after which he slept till noon; when he was again attacked with cramps; was put into the warm bath, and a scruple of calomel, and four grains of opium administered. 5 P. M. *says he has no pain* whatever; at present pulse 100 *and full* *; tongue foul and furred; perspiring; was bled to 16 ounces, and a purging draught ordered. 3rd April, *is much better; was purged* freely in the night, with some griping; but no *cramps* or pain at his stomach; *pulse* 72 *and full*; skin moist and warm, tongue foul and dry, ordered pulv. jalap. comp. with a beverage of cream tart. dissolved in water. 5 P. M. purged 7 or 8 times, stools thin and green, complaining of pain about the navel, pulse 70 and not so full, tongue foul in the centre; ol. recini ℥i. 4th April, better, slept well, no griping, pulse regular; recovered.

This is a very instructive case. We perceive how opening the bowels, and the emunctories of the skin, and allaying inordinate excitability, were the means of effectually restoring to health; and these means excluded every stimulant, even the sp. ammon. carbon. Five cases more are detailed, treated in the same way, and with the same success: namely, by bleeding, calomel, and

* I hope my readers will not overlook this filling of the pulse, when the irritability was appeased by sedatives. Let the dose of opium that was given be considered. How unfortunate that the first case of Dr. Thomason's was not treated with the same perseverance in sedatives instead of that which followed, in which recourse was had to stimulants.

opium, or laudanum, the warm bath, and afterwards a dose of castor oil.

Such are the opinions of medical gentlemen on the Bengal establishment, who support the system of stimulating remedies. In thus exposing an erroneous principle in the treatment of this Epidemic, let it not be supposed by my professional brethren, that I am arrogating to myself merit superior to theirs ; many of them are my much esteemed friends, whose superior judgments and acquirements are sufficiently known, at once to prevent such vain assumptions ; unexampled ardour and indefatigable zeal are exhibited by them, to assuage the agonizing sufferings of their patients ; neither personal safety nor necessary rest was deemed expedient or had the least weight ; the cause of humanity at all hours of day and night drew upon their unwearied exertions and kind ministration of benevolent attentions. From the same premises, men often arrive at different conclusions ; if mine should be proved the correct one, the glory is not mine, but His, in whom we live, and move, and have our being.

SECTION II.

MADRAS REPORTS.

Mr. Scot, the Secretary of the Medical Board of the Madras Establishment, on whom has devolved the task of digesting various reports from the Medical Department on that Establishment, unequivocally follows Dr. Johnson's train of reasoning on the proximate cause, and deduces from it the same course of treatment. According to this gentleman's views, "the symptoms of Cholera may be explained by supposing a diminished energy of the nervous system; but especially of that part of it, which supports the vital and natural functions. Hence the spasms or irregular muscular actions, found to occur equally in other instances of diminished nervous energy. Hence also the disorder of the stomach, arising sometimes from the spasms of its muscular fibres, and sometimes from the loaded state of its vessels. Hence also the suspension of the digestive powers of the stomach, and its incapability of being acted on, by the *ordinary stimuli*. Hence also the various affections of the intestinal canal, which so nearly resemble those of the stomach, that they need not be repeated."

Thus we find that Mr. Scot is led to deduce the same want of excitability, by supposing a diminished energy of the nervous system, in those parts which support the vital and natural functions. How he could, however, deduce diminished nervous energy from such symptoms as incessant vomiting and purging, spasmodic contractions, and sharp twitchings along the muscles of the fingers and toes, thirst, and a sense of heat or burning in the region of the stomach, it is impossible to conceive. The fact is, Mr. Scot has been confounding the effects of the disease for the proximate cause; excitability is the proximate cause, and diminished nervous energy and exhaustion of the vital functions are the effects. The mistake is of serious consequence, since the treatment recommended is deduced from such a rationale of the disease as actually

hastens dissolution, and suggests the use of stimulants, which increase the already inordinate excitement of the system, and hasten exhaustion. The only way to account for a deduction so erroneous is, that in this disease the skin is in a state of collapse and cold*, often becoming insensible to chemical agents, and the pulse is not more than perceptible at the wrist. This led Mr. Scot to conclude that the circulation was subdued. He was correct with respect to the *surface*; but the reverse, in regard to the important *internal* vital functions, where the symptoms indicated the utmost excitability.

That I may not be supposed to mistake Mr. Scot, I will give his own remarks. "If the collapse in Cholera be the effect of a direct diminution of the capability of an organ to be affected by stimuli, we should commence by doses (alluding to ardent spirits and wines) large in proportion to the supposed degree of this diminution; and we should decrease them according to the progress made in restoring excitability. But if the collapse be merely owing to a want of natural stimulus, the doses should be small in the commencement, and increased gradually." In another place Mr. Scot observes: "It has been very distinctly remarked by many practitioners, that the use of these remedies (alluding to æther, ammonia, &c.) was often extremely uncongenial to the feelings of the patient, especially those who suffered much from thirst, from burning heat, and fixed pain in the region of the stomach; and to have been productive of aggravated sickness; and *after a certain interval it was obvious that the stomach was no longer sensible to their action.*" Here then Mr. Scot confutes his own idea of the proximate cause, while he fully establishes the effects of increased internal excitability. He goes on to say: "Ardent spirits and wines have been exhibited by almost every practitioner; and indeed it is impossible to look upon a patient ill with this disease, without feeling at once a disposition to employ them very largely. *It soon becomes manifest, however, that the excitement by stimuli is insufficient by itself* for the cure of Cholera; the fatal symptoms too often come on under the most careful and assiduous use of this description of remedy; and after the stage of collapse is formed, their exhibition

* See my opinion of the Proximate Cause, Part I.

is but too frequently altogether unavailing in rousing the energies of the system."

Will not my readers be astonished at Mr. Scot's reasoning on the nature of this disease, after the inconsistency of it has been shown by the failure of such means of stimulating, deduced from his principles of diminished nervous energy? Have we not reason to feel surprise, at finding that Mr. S. concludes by recommending their adoption?

On the use of calomel, he expresses the following opinion. "Calomel has unquestionably a powerful effect in exciting the biliary system, and in this view, its exhibition is highly necessary; but the suppression of the excretion of bile being only a link in the common chain of symptoms, and its partial or occasional removal, or even its total absence, having been proved to be of little consequence in the general course of the disease, to attempt to excite it by particular means may be considered as premature and injudicious. The affection of the circulation in Cholera, more probably has its origin in some sudden functional impression, of a nature on which calomel, to say the least, can hardly be supposed to possess that rapid and direct influence which is requisite in the cure of the disease. With respect to the supposed quality of quieting the irritability of the stomach, there seems abundant proof, that in Cholera at least calomel does not possess it, but on the contrary, it was, when injudiciously administered, very often found to have quite an opposite tendency."

Mr. Scot remarks as follows on blood-letting: "The abstraction of blood, unless as an anti-spasmodic, is a remedy so little indicated by the usual symptoms of Cholera, that its employment in the cure of this fatal disease has afforded a signal triumph to the medical art. It requires no common effort of reasoning or reflection to arrive at the conclusion, that when *the powers of life appear distressed to the lowest degree, the pulsation of the heart all but extinct, the natural heat of the body* gone, and the function of the system suspended and incapable of being recovered by the *strongest stimulants*, the abstraction of blood might yet prove a remedy against a train of symptoms so desperate."

It appears to me strange, that Mr. Scot should speak here of the abstraction of blood as an anti-spasmodic. I have always understood

that there were only two kinds of this class in therapeutics: viz. stimulating anti-spasmodics, as volatile alkali, essential oils, æther, &c. and sedative anti-spasmodics, as camphor, musk, and opium; or in sanguine and irritable constitutions, blood-letting. Since this gentleman adopted the first kind: viz. the stimulating, the adoption of a very opposite remedy, appears to me to overthrow his system. For it is very inconsistent with his principles to employ a sedative, which is the acknowledged effect of blood-letting, at a time "when the *powers of life appeared depressed to the lowest degree, the pulsation of the heart all but extinct, the natural heat of the body gone, and the functions of the system suspended and incapable of being recovered by the strongest stimulants.*"

Mr. Scot notwithstanding concludes: "Bleeding was, no doubt, first employed in cases where there was much spasm, and when the power of the system had not much declined, and the relief was generally obvious and immediate; and the practice in such instances was thus established: dissection frequently having shewn a loaded state of the vessels of the viscera, and apparent *inflammation* of their mucous membranes venesection was also adopted to obviate these conditions." With the knowledge of such facts, how could Mr. Scot ever recommend the use of stimulants? Is it not irreconcilable with the general principles of science, to infer when excitement is such as to induce *a loaded state of the vessels of the viscera, and apparent inflammation of their mucous membranes*, that diminished nervous energy and excitability were the proximate cause of this disease? Mr. Scot adds: "The advocates for bleeding proceed, however, on the principle, that a certain quantity of blood is to be obtained in order to insure success, which few of them estimate at less than 30 ounces." Most undoubtedly! Small depletions, in all cases where depletion is required, are worse than useless; but we shall never be able to abstract 30 ounces of blood from Mr. Scot's patients, after the "*powers of life are depressed, and the pulsation of the heart all but extinct,*" by the previous use of stimulants.

Mr. Scot concludes this paragraph by observing: "There is the most ample evidence also, that cases especially in Europeans, even under the most favourable appearances, will often, in spite of all internal and external remedies, go on to a

fatal issue, when bleeding is not practised." Now this is strong evidence to indicate any thing but the use of stimulants, unless a sedative and a stimulant have affinity of operation. Notwithstanding this corroborative testimony, Mr. Scot cannot shake off the belief that the proximate cause of the disease is still diminished nervous energy and want of excitability; he therefore winds up with the following: "Much injury has arisen, however, from remedies being brought forward and tried, as if they were absolute, specific, and infallible, and amongst others, blood-letting has been put to this unjust and *unphilosophical test.* Strictly considered, it would perhaps, be the *least of all* entitled to the appellation of a specific remedy; for, in truth, there is great reason to doubt, whether it be *directly curative* of the essential symptoms of Cholera. *Congestion, for which alone* it is indicated, appears merely to be a symptom or *consequence* of that morbid state which forms the first and highest link in the train of Choleric actions; the removal of congestion, *which is mechanical, allows the heart to respond to the action of the other remedies.*" Congestion then, in Mr. Scot's opinion, differed from inflammation; here is the stumbling block.

Mr. Orton*, in his communication to the Medical Board, is likewise of opinion that the proximate cause of Cholera is a diminution of the nervous energy, and quotes the opinion of Cullen in support of his position, into whose argument, it will be unnecessary for my readers to enter. The description of the symptoms of the disease by Mr. Orton, a sufficient refutation; for he says, that in the first stage of Cholera, are symptoms of giddiness, head-ache, anxiety, &c. A pathology, my readers will readily confess, of any thing else but diminution of nervous energy. In the second stage occur spasms of the muscles, which Mr. Orton considers an important crisis, as it is the commencement of the third stage; but how is it possible for the energy of the nerves to be diminished, when the body and limbs are spasmodically contracted, by which Mr. Orton shews, that the powers of life are soon exhausted? In his description of the third stage, he exhibits the vital functions rapidly sinking into the fourth, which

* I have noticed this gentleman's work on Cholera at page 222.

is death. Thus by Mr. Orton's own shewing, instead of diminution, there is evident increase of nervous energy, the exhaustion and diminution being an effect instead of a cause, in the fatal form of the disease. Besides which evidence, Mr. O. himself affords in the ninth paragraph of his own report, an obvious refutation of his own position; he observes that the *appearances of inflammation (he would not deny) were present* in Cholera; for in several instances he himself had observed febrile heat and re-action come on in the latter stages; and, on dissection, *unequivocal* appearances of inflammation. Notwithstanding this, Mr. Orton would not have his mind freed from that principle to which it appears he is as firmly attached as his colleague Mr. Scot, viz. diminution of nervous energy; and he endeavours to account for the inflammatory diathesis, as an incidental or secondary effect, and consequently not essential to Cholera; but how such an effect can arise without an existing cause, or where there is privation of nervous influence, is a doctrine I must leave to Mr. Orton to explain.

This gentleman's system of treatment is founded, as a matter of course, on the same inconsiderate principle. He commences by expressing the happiness he feels in having it in his power to bear testimony, in the strongest terms, to the efficacy of the bleeding system generally; only in four cases had he seen it fail, but in them all the more severe symptoms had continued from *five to thirteen hours* before admission. "In 32 others, (says he,) I have seen it followed by rapid cures, and in 15 of these the 2nd stage had commenced. In none have I seen it *fail*, when applied *before or soon after* the commencement of that stage. One of the above cases was in a native, and it was one of the most strongly marked in favour of the practice. The *same* system has also been pursued to some extent in natives by Mr. Owen, Garrison Surgeon here, and with great success." How is it, however, that Mr. Orton reconciles bleeding with his views of the pathology of the disease; alluding to which, he remarks, "his pathology would lead us to expect great benefits from the employment of stimulants, particularly of the *spirituous kind*, for their effects are immediate on the nervous system, and they produce a sudden flow of *nervous influence* into all classes of organs?" But how does he reconcile

the modus operandi of bleeding? He certainly cannot consider depletion to act as a stimulus, so as to excite a *flow* of this said nervous influence! "Concerning the rationale of the treatment by bleeding and calomel, I have as yet said nothing *worthy* to offer," continues our author; "I conceive the practice as yet *completely empirical*, and that it remains for farther investigation to remove this opprobrium*."

After such nugatory principles and assertions as these, my readers, I trust, will be satisfied at my quitting this author, and proceeding to the next report, which is from Mr. Wyse, who is also of similar sentiments with the preceding writers. He remarks, that the proximate cause appeared to him, a sudden deficiency of the nervous energy, because the heart and the blood vessels could not propel with that degree of force which was necessary for the maintenance of health: congestion was a consequence, and Mr. Wyse is minute enough to specify its commencement at the right side of the heart, which not being able to discharge the returning blood in due time and quantity, through the lungs, these organs could not sufficiently oxygenate even the diminished quantity that circulated languidly through them: the sudden prostration of strength, the suspension of the secretion, the absence of delirium, and all other signs of excitement; the despondency of the mind, the coldness and collapse of the skin, the irregular actions of the muscular fibres; all seemed, in Mr. Wyse's opinion to prove this defect of the nervous power. My readers will find, however, that here he is, like his preceding colleagues, mistaking the effect for the cause; and how he can call sudden prostration of strength, the *suspension* of secretions, the absence of delirium, signs of want of excitement, any thing more than effects appears to me inexplicable. With the foregoing views, Mr. Wyse proceeds to point out the indications of cure, viz. "to remove the venal congestion, and to rouse the energies of the brain, venesection, early, copious, quick, is the remedy best suited to remove the former, by instantly relieving the pressure *a tergo*; diffusive, or general and local stimulants, friction of the skin, performed by hot and

* I think we may establish it as an axiom, that all things which are intrinsically good, must bear reproach before they are believed.

dry substances, seem best adapted to the other." The effects of such a principle, combination of stimulants with sedatives, is soon shewn by this gentleman. "Nine or ten patients had died very suddenly, who were treated with large doses of laudanum, and calomel, stimulants, frictions, and blisters." Subsequent to this experience, Mr. Wyse becomes more bold in bleeding, and less in the adoption of stimulants. Adverting to the case of a European patient, he remarks, that "he fell into syncope, while he applied the bandage for venesection;" but this symptom did not deter him, trusting to his experience he had learned that if blood could be drawn, an only chance was afforded of resuscitation; it was dark, viscid, sluggish, and hardly flowed; by perseverance however, he was able to extract twenty-one ounces, and thus the weight which compressed the springs of life, was removed, and a speedy recovery took place.

He acknowledges that, in all those he had an opportunity of examining after death, the engorgement of the blood vessels, of the omentum, stomach, intestines, and mesentery was such, that he fully believed no medical man, who witnessed them, could entertain the smallest doubt of the necessity of early, quick, and copious bleeding; indeed, says Mr. Wyse, "from the result of practice (confessedly not extensive) I am inclined to consider the abstraction of blood as generally speaking decisive of the patient's fate."

Mr. Paterson considered the proximate cause of the disease, to be an increased and morbid secretion of the gastric juice; whence vomiting and purging, together with spasms of the stomach and intestinal canal, watery purging and vomiting; when with the vomiting, matter was ejected like congee, then the small particles of the inner coat of the stomach were discharged. The chief effects in Mr. Paterson's opinion of a few spasmodic gushes of the gastric juice, either upwards or downwards, or both, were sudden and speedy diminution of the powers of vitality. Hence the pulseless wrists, the frigid superior and inferior extremities, and ghastly countenance; the same gushes destroy the balance of circulation; hence the determination and congestion of the blood in the different internal viscera. From the violent and convulsed action of such an important organ as the stomach, the function of the brain, liver, and kidneys are suspended by sympathy; hence

lethargy, a total absence of bile, and of urine. The difficult respiration may, in Mr. Paterson's opinion, be attributed to the "torpid action of the brain rather than to congestion of blood in the respiratory organ itself."

It would be a difficult task to penetrate into the arcana of the stomach and ascertain the proximate cause as set forth by Mr. P.; but it is likewise impossible to say whence he could derive a reason for such a supposition, since an increase of the gastric juice has never been known to occasion such effects. In hunger there is always a considerable increase of this juice; but beyond a sensation of pain and lassitude, I have never heard of vomiting and purging being induced thereby, at the period when food is taken into the stomach. Its flow, when the constitution is in health, is very considerable; but it has the very opposite effect of producing vomiting. In short, the gastric juice has actually been administered as a tonic in dyspepsia, in which affection a deficiency of this juice has been supposed to exist. I cannot, therefore, agree in opinion that the effect is the sudden and speedy diminution of the powers of vitality, or conceive such a cause, as the balance of circulation being destroyed by a morbid increase of this fluid, and the functions of the brain, liver, and kidneys, thereby suspended.

It is equally difficult to reconcile Mr. Paterson's belief, that difficult respiration is to be attributed to the torpid action of the brain, rather than to congestion of blood in the respiratory organ itself, with the generally received opinion, that congestion in the lungs would impede respiration; for nothing is more certain than this fact, whereas, in a torpid action of the brain, which is a certain effect in hydrocephalus, the respiration is not affected.

The mode of treatment corresponded with this gentleman's definition of the disease, his grand object being to prevent, check, or remove what he considered the proximate cause, viz. the increased and morbid secretion of the gastric juice, for which purpose blood-letting, blisters, and tinct. opii were depended on; and when employed early in the disease, in his opinion, they would seldom fail. It is impossible to say, to what extent Mr. Paterson's experience extended; but I should suppose, from his remark that the treatment which he suggested was inferred, that he had not seen much of the disease, and was not therefore practically

informed; especially as we are without a numerical statement of the patients treated, &c.

We are now to consider the report from Mr. Alexander, who supposes the system of nerves of the lungs to be particularly sensible to impressions; and from something deleterious in the air, their functions become deranged, or put a stop to, "an assumption not at all extravagant," says this gentleman, "as we know that the retina is at times easily deranged, and its function suspended or destroyed by strong light." Mr. Alexander concludes from hence, that all the symptoms similar to those attending Cholera will result; since all parts have nervous connection with the lungs, he conceives it a fair inference that they become inevitably disordered in their actions; hence the stomach, bowels, and bladder reject their contents, and the extremities are thrown into spasms, and the exciting cause continuing its influence, according to Mr. A. "it either paralyzes the nerves or renders them so torpid, that they become insensible to the usual stimulus of the air; their sympathies are broken, and the blood no longer freed of its carbon, by reason of the secreting vessels not possessing their nervous influence, becomes of a dark colour and unoxygenized, as the oxygen of the atmosphere cannot penetrate the air cells and coats of the arteries to perform that function." Symptoms strikingly characteristic, in Mr. Alexander's opinion, now set in; no animal heat is evolved; the body and breath become deadly cold; the secretions are stopped; the chyle, which is the supply of the waste of carbon, is no longer absorbed,—thus accounting for its appearance in the intestines; finally the larger viscera and vessels about the centre of the circulation, become choaked up, and death necessarily ensues.

Since then, in Mr. Alexander's opinion, the real cause of the disease is, that the oxygen of the atmosphere cannot penetrate the air cells and coats of the arteries, and their secreting vessels have lost their nervous influence to oxygenate the blood; the deadly coldness of the surface and extremities is accounted for, as heat cannot of course be evolved where there is no oxygen. Hence this gentleman deduces, that there is the very reverse of inflammatory tendency in Cholera, and the treatment which is indicated would, in consequence, coincide with those of the gentlemen whose principles refer to diminution of nervous energy. Mr. A.

has been guided in his therapeutics by chemical principles, and suggests the introduction of the nitrous acid gas, as being most likely to remove the torpor of the pulmonary nerves; and when the exhausted system is by this means excited, he proposes to substitute in its place oxygen gas, that a speedy purification of the blood may be effected and animal heat evolved.

In his dissections, Mr. A. observed a diffused blush on the peritoneal covering of the small intestines; which, however, he did not of course attribute to inflammation, but to the carbonaceous state of the blood, not conveying a stimulus of contraction to the arteries, the liver, lungs, right auricle, left ventricle, and large arteries, arising from the heat, which were all, however, loaded with dark blood; there was likewise a blackness of the choroid plexus, and turgidity of the vessels of the pia mater, caused, in Mr. A.'s opinion, by the obstacle that existed to the return of blood from the head, in consequence of the loaded state of the thoracic viscera, and the unstimulating, or in other words unoxygenized state of the blood.

The principles deduced from the foregoing reasoning of Mr. Alexander's were, it appears, considered by the members of the Board of sufficient importance to induce them to issue a circular, dated 18th October, 1818, of which the following is a copy.

"A diversity of opinion exists regarding the influence which the state of the blood, in those affected with Cholera, may have in producing some of the symptoms of that disease, and the Board do not yet possess facts sufficiently numerous and explicit to enable them to determine the question. I am desired by them to request, that you will communicate the result of your observations on the subject.

2nd. It is especially desirable to know, whether in every case, and in every stage of the disease, the blood abstracted from a vein was of an uncommonly dark colour, whether the colour became less dark after a certain quantity had been abstracted, whether if the colour was changed during the bleeding, the prognosis was thence more favourable, and whether if you practised arteriotomy, the colour of the arterial blood was natural. It would be satisfactory to know the period from the accession of the disease, at which your remarks on the state of the blood were made."

The result of these questions, Mr. Scot gives under his article on the proximate cause, which he ushers in by speaking of the analogy or resemblance between the symptoms of Cholera, and those produced in the body by certain animal and vegetable poisons, and other noxious matters. From the experiments of Mr. Brodie, it appears, that certain vegetable poisons act by destroying the energy of the brain, and that in such cases the blood is found to be of a dark or black colour, but the heart is not immediately affected, and it continues to circulate this black blood for some time after death; and that others act at once on the heart, and by a suspension of its action destroy life, in which cases the blood is of a florid or scarlet colour. "In Cholera, however," observes Mr. Scot, "there seems to be an equal diminution of those powers, which produce the circulation of the blood, its florid colour, and the evolution of heat."

The blackness of the blood in Cholera had been proved by experiments *not to retard the circulating power of the sanguiferous system*, and it was also proved that the blood occasionally retained its *florid colour, even after the disease had been established some time.* The history of Cholera shewed likewise *that heat was evolved at a time when the circulation was almost subdued, and when the reddening of the blood did not appear to be affected.* Notwithstanding these facts, as set forth by Mr. Scot, he remarks that Mr. Orton's first proposition, viz. that the proximate cause of Cholera consists in a diminution of the energy of the nervous system, was pretty generally admitted as true; not equally so however his second proposition, viz. deprivation of nervous influence, or what would be ordinarily understood by the term subduction of the natural stimulus. "There appears," adds Mr. Scot, "from the history of Cholera, to be even very little connection between one part of the nervous system (including the brain) and another. If there were but one general cause of the functions of the brain and nerves, then a subduction of that cause would lead to a diminution of nervous energy, and it would extend to all the functions, as assumed by Mr. Orton; but evidence is not wanting to shew, that the functions are very far from being generally affected in Cholera, and it seems more reasonable to conclude, on an attentive consideration of the phenomena of the disease, that the

symptoms are severally produced by one or other of these causes, a diminished energy primarily arising in that part of the nervous system, governing the respective seats of the symptoms; a want of the natural stimulus, or a diminution of the nervous power, arising from a cause originating in these seats, and affecting the nerves secondarily." So that Mr. Scot does not correspond in sentiments with Mr. Alexander, saving in that principle, viz. a want of natural stimulus, or that abstraction of heat is the proximate cause of Cholera; but since it has been proved that the blood occasionally retained its florid colour after the disease had been established for some time, we have a discrepancy in principle, which Mr. Scot seems to qualify, by adding, that the function of the lungs in reddening the blood is sometimes preserved, as shewn by experiments, while the evolution of heat ceases, referring to the action of poison on the brain; but the history of Cholera proved, according to this gentleman, that heat is evolved at a time when the circulation was almost subdued, and when the reddening principle of the blood did not appear to be affected. The more natural conclusion, according to our author is, that the function of the lungs partakes only of the disorder which affects the other functions, and is not itself primarily affected.

In this tedious disquisition we realize the important truth, that as there are many things, as in mathematics, which may be perfectly true in theory, but notwithstanding will fail altogether in being reduced to practice; or, as was very correctly asserted by the ingenious Mr. Watt, that out of ten machines or engines of art, which are exhibited, and against which no solid exception could be raised as to their sufficiency to produce the intended results, eight or nine at least would fail, when brought into operation; such, we may assert without fear of contradiction, is the result of hypothetical propositions in medicine, when brought to the test of clinical experience. And such, I shall endeavour to prove, was the result of those indications of cure deduced from principles so plausibly proved *a priori*, and strenuously persisted in by the authors I have quoted. We cannot but deprecate this love of theorizing, when it soars above common sense, and loses itself in unintelligible abstractions. No doubt the gentlemen who have reasoned upon the proximate cause of Cholera, have thought that they propounded

nothing but demonstration; theories which deserved to be held up for professional guidance; infallible maxims, in their opinion, and principles incapable of being overthrown or successfully opposed. These systems I have now to bring to the test of clinical practice, which will shew how lamentably erroneous the treatment founded on them has been.

Mr. Haines does not offer any opinion in his report on the proximate cause of the disease ; but observes, that spasm, a burning sensation, and oppression over the præcordia, were concomitant symptoms. When a patient was admitted, he administered a draught of laudanum, from 60 drops to ʒ ii. to which he added camphor, and 15 to 20 grains of calomel, and immersed the patient in a hot-bath ; friction, aperient enemas, and blisters, were employed; large quantities of ardent spirits, "*sometimes exceeding three quarts have been given in a few hours*, with the intention of supporting the vis vitæ." Of bleeding, in this complaint, Mr. Haines could say nothing ; never having seen a case that appeared *to justify the attempt.* The result of Mr. Haines' treatment is thus given: admitted 48 ; recovered 25 ; died 23.

Mr. Rogers is of opinion, that the proximate cause is diminished action of the vital functions, and increased irregular excitement in the animal and natural ; he describes the concomitant symptoms to be violent spasms, extending to the abdomen and thorax. The practice he resorted to, was early and vigorous administration of calomel, in doses of one scruple, conjoined with frequent draughts of æther and laudanum, which were given in peppermint water or brandy, in the proportion of one drachm of each of the former to an ounce or two of the latter, every quarter of an hour, until relief was attained; so that in 12 hours a patient would have taken as much ardent spirit as was administered in the preceding Report. The result of this treatment was, that of 11 cases, 6 proved fatal.

The report of Mr. Wyllie will deserve some attention. His opinion of the proximate cause may be concluded to be diminution of vital energy, since he thinks, in regard to the treatment, that two indications of cure are to be kept in view ; 1st, to stop the discharge, and 2nd to support the vis vitæ: to fulfil the first, he administered seven grains of calomel with two of opium ; and for the 2nd, he prescribed warm brandy and water in small repeated

quantities, or a mixture of ammon. subcarb. and confect. aromat. The success of Mr. Wyllie's treatment is thus mentioned: on the 31st of May "the disease appeared with great violence among the troops, and of all attacked on this day, the greater proportion died, most of them becoming corpses in a few hours after being brought to the hospital, and others dying in the night or next morning; on the 1st of June, the number attacked was very great, but fortunately the deaths had greatly lessened; on the 2nd, we had not so many new cases; on the 3rd and 4th, they were fewer; after the 5th, the number admitted had been very trifling; and although the disease still continued to shew itself, it has ceased to have the appearance of an Epidemic, and only occurs sporadically."

In the conclusion of this gentleman's report, he observes: "Having said thus much, I feel it necessary to add a few words on Mr. Corbyn's practice, which has been represented as so invariably curative. I am sorry to say, that although I implicitly followed his directions *on the first appearance* of the Epidemic, yet my trials were so unfortunate, that I was discouraged from continuing them; from what cause my failures proceeded, I will not take upon me to determine." It will be better that an impartial person should explain this cause, of which Mr. Wyllie pleads ignorance. Mr. Superintending Surgeon Peyton makes the following remarks: "The symptoms in general were such as described by Mr. Corbyn. The spasms in the natives were scarcely observable, although they conplained much of them. Mr. Corbyn's plan was chiefly found to be successful, when the patients reported themselves *in time, that is within 5 or 6 hours, after which period the pulse is not to be found in the wrists, the extremities become cold, and the prostration of strength is complete, and death ensues very soon.*" Mr. Kellie also remarks, that "the mode of treatment on which the greatest reliance has been placed and adopted here, with some success, is that recommended by Mr. Corbyn; but to insure that success, the remedies must be exhibited at the very attack."

Since therefore Mr. Wyllie reports, that he only followed my directions on the "*first appearance*" of the disease, when cases are always protracted before they are reported, the cause of the

failure of the treatment is hereby accounted for; as also in the instance, in a subsequent report of a similar kind from Mr. Shedden, who says, that the medicine was administered immediately the "patient was brought into the hospital," which is not evidence that it was given on the instant of the attack.

Mr. Wyllie next remarks, "I cannot but express my astonishment that Mr. Corbyn should find his patients so far recovered on the 2nd day, as to enable him to give 30 grains of jalap, as he appears invariably to have done." I would recommend Mr. W. to turn to page 75 of the Reports, where he will find Mr. Campbell reporting the case of a patient, to whom he administered remedies according to my directions; having mentioned the exhibition of calomel and opium, with bleeding, he adds, that "eight hours after this a strong dose of jalap and a purgative enema were exhibited," and the patient recovered.

Mr. Shedden reports, that there was evidently a general derangement of the whole arterial system, the circulation of the blood being confined alone to the organs essential to the continuance of life. The treatment recommended by me, Mr. Shedden appears to have first adopted; but failing to have that efficacious result he anticipated, although these were *combined with stimulants*, he was inclined to try some more powerful means to create warmth. These remarks are preceded by the following:

"In several cases, which at first came under my care, the patients sunk into the cold stage of the complaint, and the pulsation of the arteries *ceased in the course of half an hour after the first symptom* had made its appearance, accompained with all the other symptoms given to us by Mr. Corbyn, with the exception of vomiting, the evacuations being wholly by stool, consisting of water only, and very copious." It appears then, that my remedies were given to patients in the last stage of the disease, when the circulation had ceased, in which state they entered Mr. Shedden's hospital; for he remarks, that "*even the pulsation of the larger arteries of the body, for instance, the femoral artery, in the inside of the upper part of the thigh, was not to be felt.*" My remedies consequently were no longer to be trusted, because they did not reproduce the action of the heart, "*which had almost ceased to beat.*" Mr. Shedden was therefore induced to try in

his subsequent treatment more powerful *means to create warmth*, to increase the action of the heart, and to restore, if possible, the circulation of the blood in general. He accordingly used stimulants, both internally and externally; internally, brandy and water in equal quantities were given, as hot as the patient could drink it; and improved with *plenty of spices*, such as cinnamon, cloves, cardamums, and ginger, administered every quarter of an hour, half hour, or hour, in the quantity of *half an ounce or an ounce* at a time, according to the nature of the case, and the urgency of the symptoms present. This was rousing the system indeed!

The effect, I shall describe in Mr. Shedden's own language: "On the morning of the 28th of July, this disorder assumed a very deadly character indeed; five Sepoys of the 1st Battalion 7th Regiment having been suddenly seized with a copious watery purgings, unaccompanied by vomiting, were carried to the hospital, and immediately this symptom made its appearance. When I saw these men, which was within ten minutes from the time they had been attacked*, their pulse was not to be felt, their skin cold, with a clammy moisture over it, their eyes sunk, and in short reduced to the most helpless state in the course of that short period. Six other natives, belonging to the bazars, and two servants, were seized with the same melancholy symptoms, on the same morning, and *all*, together with the five Sepoys, fell a sacrifice to this dreadful visitation of the disorder, in the space of from one to twelve hours from the time they had first complained of being unwell. Two villagers died in the same way on the same morning; making in all fifteen deaths in one morning, the total attacked with the disorder on that day."

Mr. Dean reports the recovery of a native on the onset of the disease; but affords a melancholy detail of the death of every case in his own (the Madras European) Regiment. The cases are detailed separately, and their dissections. His treatment consisted of large doses of calomel, laudanum, to which was added spt. ammon. and hot brandy and water, "with a view of stimulating the stomach."

* My treatment does not appear to have had so favourable a trial as this.

It had this effect, for on the dissection of the patient above alluded to, Mr. Dean remarks, that he found the inner coat of the stomach slightly inflamed, appearances of congestion in the small intestines, &c. &c. It would be natural to suppose, that after such discoveries, Mr. Dean would have pursued a very different system from that of administering stimulants, as we find him laying the charge of inflammation of the stomach to their action. "It should have been remarked," says Mr. Dean, "that this man, about an hour previous to his death, complained of being unable to pass his urine; some drops of the spts. æth. nitros. were given, and warm fomentations were again applied to the lower part of the abdomen. I attributed these symptoms to the cantharides, and the appearances of inflammation on the inner coat of the stomach to the stimulating remedies which had been given him." Instead, however, of finding Mr. Dean abstain from the use of stimulants, although he mentions in the preceding cases, that the patients complained of *burning heat in the stomach*, that the diaphragm seemed much affected, *and pungent shooting pains across the chest was complained of;* the cases which follow are treated in the same way. The remarks, in the case of Demster, two days subsequent to that of the preceding, that "the calomel *was repeated as was every description of stimulants;* but he died at 3 A. M. of the 22nd July: the body was opened at 9 A. M. Some *appearances of inflammation were perceptible on the left ventricle of the heart, and the pericardium had adhered to that part.*"

On the same day with Demster, it appears Drummer Vine was treated, respecting whose case Mr. Dean remarks, that "*the same remedies as above were given, his extremities were rubbed with spirituous liniments;* a blister was raised over the epigastric region; the medicine was retained until he had taken four doses, he then vomited once, and brought up but little; he had no purging *in* hospital. *Every stimulating remedy was tried with assiduity,* but in vain; he died at ½ past 1 A. M. of the same day."

Three other cases were admitted two days subsequent to this. They all died; and although on opening Bradey, the same appearance of inflammation was exhibited in the heart, as seen in Demster, it does not appear to have opened the eyes of Mr. Dean to the injurious effects of administering stimulants; for he remarks

that two days subsequent to the treatment of the foregoing, "Private Clarke was brought to the hospital on the morning of the 23rd, with the usual symptoms, collapsed countenance, cold skin, feeble fluttering small pulse; the warm bath and the remedies *were used to the greatest extent as in the other men;* his spasms and cramps were very violent, and the vomiting for the first hour very *distressing. No relief was derived from any thing,* and he died at 12 o'clock that night." It appears after this melancholy history of deaths, the Epidemic ceased to be violent. Mr. Dean remarks, "during this day (23rd), many cases occurred of the disease, but in a much slighter shape;" and consequently we observe that some recover.

In September following, the disease again appears in Mr. Dean's Regiment. The first case is treated with large doses of calomel and laudanum; no mention is made of stimulants; this patient recovers as well as the second, treated in the same way as the preceding, with the exception of a glass of wine one hour subsequent to the attack. Notwithstanding, however, this success, *without stimulants,* three cases are afterwards admitted, to whom stimulants are again administered, and my readers will not be astonished when I tell them that the whole died.

Mr. Cox states in his report, that his treatment consisted in giving scruple doses of calomel, washed down with brandy and water; likewise in administering magnesia, combined with laudanum, and spt. ammon. His first patient died. In the next two cases, no mention is made of the brandy and water; the only stimulants given with the calomel and laudanum, being 40 drops of spt. ammon. which would have no effect to increase excitement, when diluted in water. These patients recover. On the 27th, however, we find Mr. Cox again using stimulants. He remarks, "I gave him 80 drops of laudanum in a small quantity of strong brandy and water, which was thrown up three or four times; *the burning heat was very great,* warm arrack and chillies were rubbed over the stomach for some time, and about 5 o'clock, 100 drops of laudanum in warm brandy and water given, and repeated in half an hour, with 40 drops of æther, the sickness and purging now seemed to cease, the spasms *continued.*" It will be sufficient to say, that the patient *died, and the result* shewed Mr. C. that the *treatment*

had been injudicious; as he makes the following remark, which, it is of importance, should be impressed upon the minds of medical gentlemen who have advocated the administration of stimulants.

"I reproach myself," says Mr. Cox, "for not having *used blood-letting* in the early part of this case, and glisters, had I the means of using them; but a want of syringe, or bladders and pipes, prevented me." In the next case, therefore, which occurs, we find Mr. Cox saying "I took 10 oz. of blood away, which was done with difficulty; although two veins were opened, it flowed very slowly; it had the good effect of preventing spasm; the man *regained his warmth by* 5 *o'clock in the evening, and at* 8 *was much better.* The same means were adopted as in the former cases, however, and stimulants were given; at 10, the effects were discovered in apparent debility. The stimulants had doubtless reproduced the heat in the stomach. At 12, he escaped from his bed, went to a tank to remove the distressing symptoms of heat by drinking, and next day his body was found floating in it."

It is unaccountable why Mr. Cox should again have had recourse to stimulants, when he had observed the beneficial effects of depletion in the preceding case, which proved that stimulants did not lessen the agonizing spasms, and increased those burning sensations which are the prominent and distressing symptoms in this disease. Three cases are afterwards detailed by Mr. Cox, neither of which could have been bad cases of Cholera. The first was that of a patient attacked early in the morning, and Mr. C. did not see him till 6 in the evening. The other was an officer, who never experienced any of the urgent symptoms; Mr. C. bled them, and since the foregoing recovered, he writes as follows, to the Secretary of the Medical Board: "I was not a little pleased in reading your letter of the 10th instant recommending blood-letting in this most fatal disease. I received it on the morning of the 14th, and was totally at a loss how to account for its good effects, in so reduced a state, to appearance, as well as to the quantity of fluid evacuated by stool and vomiting in every case, unless it is produced by *obviating the determination of blood to the stomach* and mesentery." This then would indicate any thing but stimulants.

Mr. Stone's opinion regarding the proximate cause of the disease is, that as a languor, and indeed sudden cessation of power in the vascular system, depends on its consent and sympathy with the general morbid derangement of the whole nervous system; and as a strong and full pulse is accounted for by the power the ventricles possess to give free and forcible circulation to the sanguiferous fluid, so the weak and almost imperceptible one, which marks this complaint, may be owing to a deficiency of that power. Hence in Mr. Stone's opinion, there is an absence of every inflammatory action; believing that inflammation is shewn only by a hard, full, and contracted pulse, together with heat of the surface of body; whereas in Cholera, the pulse is soft and small at first, and as the disease advances, it totally dies away.

With these premises the general intention of cure, according to Mr. Stone, is to overcome the violent spasmodic action of the stomach and bowels; to support and prevent that rapid sinking which takes place; and to restore the functions of the alimentary canal; and to relieve oppression of the sensorium. The first and best remedy in this gentleman's opinion was opium, which he believed would overcome, in doses of 120 drops, the morbid sensibility and violent action of the whole nervous system. But it will appear remarkable to my readers, that Mr. Stone should join this powerful sedative, this allayer of violent nervous action, with essence of peppermint, spt. lavend. c. and brandy and water. Our author would not use large and repeated doses of calomel, lest inflammation should thereby be induced; for in dissections of bodies who had died of this disease, he had observed marks "*of slight inflammation*," which in his opinion were induced from "a free use of calomel."

The effects of Mr. Stone's treatment, therefore, were, that he lost more than 37 per cent.; for he reports that of 16 who were admitted, 6 died. Strange to say, however, Mr. S. subsequently remarks, that if the patient was strong and healthy, and the pulse at all perceptible, he bled nearly *ad deliquium*, with a view of removing the obstructed circulation, which he ascribed to the diminished force of the heart, and a spasmodic action of the smaller arteries and minuter vessels.

Mr. Train does not venture upon an opinion of the proximate cause ; but reports that his treatment consisted in giving a draught of laudanum, with camphor, ammonia, and peppermint in hot arrack ; together with frictions, mustard poultices, &c.. The result of this treatment was, admissions 66, deaths 50.

Mr. Duncan commences his report by apologizing for not being able to communicate more than a general statement of the diseases. He says, the symptoms were, a pale contracted countenance, eyes sunk in their orbits, fixed and of a glassy appearance, *no pulse* at the wrists or temples, and scarcely perceptible on placing the hand over the seat of the heart. He adds, that the disease, though severe, *was in no respect accompanied with spasms.* The above symptoms generally attended those patients who had the disease for any length of time (about 6 hours). Those cases which recovered, (for all the preceding died,) were those, in whom the pulse could be slightly felt, fluttering at the wrist and skin, not so deadly cold. Mr. Duncan offers no opinion on the proximate cause, but describes his general treatment to have consisted of tinct. opii gtt. lxxx. spt. oryzæ, arrack or spirits extracted from rice (of the strength of which I am ignorant,), ℥i. ol. menth. pip. gtt. vj. This draught being once or twice repeated, generally allayed the irritation of the stomach, when it was followed up by a mixture of spt. oryzæ. aq. fervent ℥ i, piper. nig. ℈ ij. capsic. ann. ʒ ss. and about an ounce of syrup to make it palatable. This mixture was given every half hour, (dose not stated,) with bags of hot sand to the chest, feet, and hands.

Mr. Duncan remarks : "During the course of the disease, I did not observe one case that could have been benefitted by calomel! However, to a patient who was extremely low, from frequent vomiting, attended with very great irritation in the stomach and bowels, calomel was exhibited in scruple doses with tinct. opii, &c. according to Mr. Corbyn's system ; but with evident *disadvantage ;* the calomel having been instantly rejected, although the plain draughts of tinct. opii were generally retained a quarter of an hour. The calomel was repeated twice. Out of 5 cases treated on the stimulating plan, 13 died, every one of which was beyond the power of medicine ; having been (as before mentioned) upwards of six hours sick before application was made for medical aid. In

fact, from what I have seen of the disease, I am perfectly convinced that not a casualty would have occurred, had the patients been brought to the hospital within 3 or 4 hours after the attack."

It appears then from the foregoing, until we are more fully informed of the spirituous strength of the arrack, that it is doubtful whether Mr. Duncan's patients in the first stage of the complaint actually took a stimulant; for 80 drops of laudanum were twice repeated, when the irritation of the stomach was allayed, whereby we may conclude, that 160 drops of laudanum taken within the hour, acted as so powerful a sedative that the two ounces of weak spirit, which I believe the country arrack to be, did not prove sufficient to counteract the operation of the opiate draughts, more especially as there was an absence of spasms in all Mr. D.'s patients. When the subsequent mixture was administered, and the doses in which it was given, two very important therapeutical circumstances are not however communicated as they should have been. Mr. Duncan also observes, that there were only "57 cases treated on the stimulating plan, 13 died, every one of which was beyond the power of medicine." It is to be lamented, that Mr. Duncan has not been more minute in his numerical returns, by which we might have ascertained how many cases were actually admitted, died, and recovered, and how many cases had been treated according to my direction, and in what stage of the disease.

The other report, from the same station, (Arcot,) is from the pen of Mr. Conran. His treatment was the same as Mr. Duncan's. This gentleman states, that he was appointed to a hospital for the reception of the native inhabitants. He adds, "no great number of patients came into the hospital, owing to the disinclination of the natives to all such establishments. When we saw this, one of the practitioners was kept in the hospital, and the other constantly sent round the village to administer to such as should be taken ill; in this way, they were most happy to receive medicine, and it was consequently given to some hundreds who were seized with the Epidemic."

The deaths among those who took medicine, is reported to Mr. Duncan, to have been eight in a hundred; but as this is native evidence, which is always very uncertain, it cannot be received as satisfactory. 25 cases, however, were treated in November,

personally, by Mr. Conran, out of whom five died; and in December 18, of whom two died.

The report from Mr. Hunter does not contain a statement of the number of his patients. He remarks, however, that the treatment he adopted was the exhibition of small doses of laudanum from 15 to 20 drops, every ten minutes, in two table spoonfuls of brandy; and the same quantity of camphorated mixture. This gentleman also shortly afterwards remarks, that "no calomel was employed, as from a consideration of the above detailed symptoms, it did not appear to belong to that class of stimuli, from which, being permanent, much advantage could be expected in a disease so rapid."

The next report I have to mention of the unsuccessful issue of combining brandy, laudanum, and calomel, is from Mr. Grant. He remarks, that the practice which he followed, "was immediate, large, and frequently repeated doses of calomel and laudanum, with small quantities of brandy and water, warm peppermint, and in some cases the mixt. camphor. was given frequently, with bottles of hot-water to the feet and stomach, and mustard poultices to the same part. These were the principal means tried, but I am sorry to say with little success."

Dr. Fasken, in his report, considers, that "the whole nervous system was deranged, and the arteries, ceasing to perform their functions, become oppressed and loaded; the indication of treatment was therefore to rouse the sinking powers of life, and remove the irregular and morbid train of action in the system, to answer which intent, strong stimulants, such as brandy or arrack, either pure, or diluted, together with calomel and opium, were employed; the spirituous liquors were given *neither in limited quantity* nor at any certain period, but just as the symptoms required."

Three grains of calomel and one of opium were formed into a pill, three of which constituted the dose. Dr. Fasken, however, says, that he tried venesection in one case with success, which naturally induces him to observe: "It seems somewhat paradoxical to have recourse to so powerful a *sedative as blood-letting*, and such active stimulants as brandy, &c. at the same time, and to deplete the system at the very time we wish to give it vigour."

In explanation, this gentleman remarks, that the bleeding was in order to relieve the local congestion, and diminish the bulk of the circulating fluid; and to give stimulants, was with a view of exciting and renewing the suspended action, which in Dr. Fasken's opinion was not very inconsistent.

The Report to which I have now alluded, is dated August, 1820. In July 1822, however, we are favoured with another from the same physician, wherein experience has induced him to follow a different practice, and one I have no doubt my readers will acknowledge to be more consistent in principle than the preceding. "Blood-letting," remarks Dr. Fasken, "would seem to be highly indicated;" and again, "after the re-action is fully established, venesection is not unfrequently necessary to prevent inflammation and disorganization of the affected organs." If then venesection is not unfrequently necessary to prevent inflammation, Dr. Fasken cannot any longer help deeming it a very inconsistent practice to have recourse to active stimulants, since by experience he has shewn that inflammation is an effect of re-action. The direful result of adding to such an effect, is at once manifest after the operation of bleeding. Dr. Fasken mentions, that "*calomel and opium seem to be very useful* in the *first instance, and an active purgative, as soon as the stomach will retain it.*" The result of Dr. Fasken's treatment in 1820, is: admitted 138; died 74; recovered 64. So that he lost more than he cured. Of the result of the treatment in 1822, he does not unfortunately give a statement of admissions and discharges.

Mr. Stoke, in his report, considers the proximate cause to consist in a remarkable and rapid prostration of the vital powers, and a want of harmony or equilibrium in the performance of the animal functions. The indications of cure were therefore to rouse the system, which he endeavoured to do by a stimulating plan of treatment; and when the symptoms were violent and threatening, bleeding, in conjunction with stimulants, was had recourse to in many instances.

Mr. Stokes gives a detail of 10 cases, treated on this plan, all of whom died. He next states the case of Imam, a Sepoy, treated without stimulants; but with tartar emetic, who recovered The next case. Bawa saib, was successfully treated by the extraor-

dinary large doses of four grains of opium every half hour, for two hours. What will those, who advocate the stimulating system, say to this? The next case treated with laudanum, also recovered. There is only one case in which Mr. Stokes mentions his having administered a scruple dose of calomel, viz. a man who entered his hospital at Nagpore, who recovered.

Mr. Cruickshank reports, that he placed his chief reliance on the use of alcohol; he also gave opium; but never administered calomel, or had recourse to blood-letting, in the first stage of the disease. The first cases he witnessed, died. These were relations to Sepoys; but soon Sepoys themselves were brought to him. Of this also, in a considerable proportion, the disease terminated fatally. It is much to be regretted that among many of the foregoing reports, there has been such great disregard to regular tables of admissions, deaths, and discharges. In giving therefore an account of Mr. Cruickshank's treatment and result, as of many other gentlemen, I have quoted his own words, that the statements made in my review of them, may be unsuspected.

I shall now proceed to notice cases of Cholera treated on the foregoing principles, by medical gentlemen in the hospitals on the Madras establishment.

The first case is by Garrison Surgeon Howard. He administered 80 drops of laudanum, in some hot brandy and water, which was repeated every two hours, blistering liniment was carefully rubbed on the epigastric region; stimulating frictions were diligently applied to the extremities; he was directed to take a table spoonful of strong brandy and water, to which was added twelve drops of laudanum, a like quantity of æther every ten minutes, and an anodyne injection, to which was added a solution of asafœtida, which was directed to be thrown up every hour or two as appearances might indicate. When we contemplate the very opposite effects produced by the action of brandy, æther, laudanum, and asafœtida, it is difficult to conceive the principles of such a prescription. The foregoing were administered about one in the morning; by 6 in the evening, as might naturally be expected, the patient complained of sense of heat about the epigastrium, and the laudanum and æther draughts were directed to be given in a table spoonful of strong camphorated mixture, instead of brandy and water. This patient died.

Nothing particular was observed on dissection, saving that the lungs were much distended, and adhered loosely to the diaphragm; adhesion which appeared to Mr. Howard, of long duration; who also observes, that the patient had only arrived in India four months preceding the attack; and had been almost constantly in his Regimental Hospital. The paticnt's complaint had been chronic ophthalmia, for which he had been subject to repeated abstractions of blood. Mr. Howard, therefore, was of opinion that it was favourable in this case, that the living powers were much weakened, which perhaps may account for his treatment.

The next case is a European, as detailed by Mr. Wilson. He took calomel xvii. grains, with 20 drops of laudanum, in a claret glass of brandy and water. The medicine remained on his stomach about one hour and a half, during which time he was supplied with hot brandy and water to allay his thirst. At this period, part of it was discharged; hot fomentations were applied to the extremities, and an enema, containing two drachms of laudanum was injected, without any good effect; small doses of calomel with extract. of colocynth. and antimony powder were now given; a large blister was also applied to the abdomen. At 6 o'clock in the evening a consultation was held with Mr. Surgeon Davies, and it was agreed to abstract blood, which was done to the extent of 24 ounces; but it appears to have been too late. Several other purgative remedies and anodynes as well as purgative enemas were used; warm applications, hot bricks, and frictions, were ordered, and for the support of the strength, doses of hot brandy and water were administered; but without avail—the patient died.

Nothing remarkable appeared on dissection, excepting that the lungs were completely distended with blood, of the darkest colour, and the gall-bladder adhercd firmly to its villous coat. Three cases of nativcs are given by Mr. Wilson, who recovered under the above treatmcnt.

Wc come now to the cases relatcd by Mr. M'Leanc, of H. M. 84th. Scrgeant Sanderson is the first case mentioncd. He was placed in warm blankets; and frictions, with a strong liniment composed of chillies, mustard, garlic, a proportion of spirits of

turpentine, and arrack, were applied to the abdomen and extremities; bottles of hot water were also placed upon the feet and sides of the body, fifteen grains of calomel, with 60 drops of laudanum, in one ounce and a half of camphorated mixture, were administered; but as it was rejected in 20 minutes, the laudanum was repeated in two ounces of rice-water, and injected by enema; four ounces of port wine were now given with spices made warm; and repeated every half hour. After this, 10 grains of calomel and 100 drops of laudanum were given. After a lapse of about 12 hours, a blister was applied over the epigastrium; one hour subsequent to this application, *some warm* spirits, with 50 drops of laudanum, were given, but rejected. In another hour, the *spasms* returned to the legs and arms; 15 grains of calomel, 18 drops of laudanum, with the port wine were repeated; warm bottles, and frictions; a 10-grain dose of calomel, with 60 drops of laudanum, also the port wine and spices were a short time subsequent to the foregoing given, but without avail. The patient died.

On dissection, the small intestines were found slightly inflamed, externally the villous coat particularly inflamed; with some slight inflammation of the villous coat of the ureters.

The next case was admitted five hours after the attack. Large doses of laudanum, spt. ammon. aromatic camphor mixture, and a scruple dose of calomel, are now administered and one pound of blood abstracted; warm bath, together with an anodyne enema; and the medicine is repeated after an hour; vomits in the bath, when warm spirits with spices, with 100 drops of laudanum are given; vomited the draught; the first draught is therefore repeated; he is again bled to the extent of eight ounces; at 11 o'clock *port wine*, with spices, is given, and a drink of congee, brandy, spices, and sugar, are given as occasion may require; at 12 spasms return. This man also died. On dissection, small traces of inflammation are discovered in the stomach and the intestines.

The next case is from Mr. D'Lisle. Lt. Col. T., who refused calomel, took 100 drops of laudanum in two ounces of brandy; three hours afterwards, finding repeated doses of the laudanum fail, the calomel is administered, but too late; he died. On dissection, the upper part of the duodenum was found inflamed.

Mr. Superintending Surgeon Stirling commenting on this case, remarks, that it was to be regretted that he did not propose bleeding, particularly as Colonel T. was a stout man, and could have borne depletion well. The practice of bleeding in this disease, this gentleman very judiciously observes, may be somewhat analogous to its use in the convulsions of puerperal women, for which it is the only remedy, according to his belief, that can be depended on, although inflammation is not even suspected.

Of the cases from Mr. M'Cabe, the first detailed is that of a private. Two ounces of brandy, 90 drops of tincture of opium, and two drachms of tincture of capsicum, were instantly given; fomentations were carefully and extensively applied, and heated bricks and bags of sand to the extremities; spirits and water, and ginger-tea were supplied as drink; the draught was rejected; it was repeated with a simple dose of calomel; the region of the stomach was rubbed with spirits of turpentine, and an anodyne injection thrown up every second and third hour; the calomel and draught were repeated also in the evening. Camphorated mixture with æth. vitriolic was given, and five grains of calomel, and four of camphor ordered every three hours. This patient died. Dissection exhibited nothing of a morbid nature, except a considerable determination of blood to the whole of the abdominal viscera.

The next patient had 150 drops of laudanum added to the first draught; half an hour elapsed, when 160 drops of laudanum were repeated with the draught, being 310 drops of laudanum, which was certainly a most powerful sedative, and we might suppose it would counteract the stimulating effects of the brandy; three hours subsequent to the foregoing, 20 grains of calomel with another draught of laudanum and æther, of each a drachm, in mist. camph. and aq: menth. of each ℥iss; the patient slept in the night for some hours; but awaking in the morning with severe spasms, 20 ounces of blood were very judiciously abstracted, which afforded immediate relief to all these alarming symptoms; after the bleeding, one scruple dose of calomel, with 130 drops of laudanum, æther, and tinct. capsici, each one drachm, in peppermint water, three ounces; four hours after these doses tinct. cardam. and tinct. jalap. of each three drachms, were given, which effected two bilious motions;

after this, calomel and camphor ; another aperient draught effected the recovery of the paticnt.

The above case was evidently cured by the powerful sedative effects of large doses of laudanum, which counteracted, with the abstraction of blood, the injudicious administration of brandy, which Mr. M'Cabe was in the habit of combining with the first draught, on the admission of a patient. In the following case, however, Mr M'Cabe did not give large doses of laudanum ; he merely gives 10 drops, combined with the brandy, and abstains from bleeding ; this patient as we might reasonably expect, dics. The next is bled, and has the large doses of laudanum and calomel, and recovers. In the next again, no blood is abstracted ; the doses of laudanum are not mentioned ; he dies. The lungs were found turgid with blood of a large livid appearance. In the left side of the heart there was rather a deficiency of blood, while in the right side of this organ and the vessels connected with it there was an evident accumulation, and the small intestines were highly injected.

The subsequent case is instantly bled to thc extent of 55 ounces, which entirely relieved the patient from the spasms and violent pain of the stomach ; after this, an antimonial draught; the patient fell aslcep in half an hour, and continued so till 2 P. M. when vomiting returned, with short and difficult respiration, and a livid appearance of the lips and face, &c.; bleeding was again (and let me urge on my readers its judiciousness) recurred to, and the abstraction of 30 ounces completely relieved his breathing ; this patient was subsequently trcated with sedatives, and I need scarcely observe, that he recovered.

Several other cases are given by Mr. M'Cabe; but as an investigation of them would cxhibit similar results to the foregoing, I must lcavc this gentleman, to cxamine thc rcport from Dr. Daun. His first patient took cal. ℈i washcd down with mist. stimul. oz. ss. these werc shortly vomited, upon which they werc repcated ; hot bath and a stcam couch werc ncxt tried ; his vomiting returned, howcvcr, with cramps in an aggravatcd dcgree ; by this time the pulse could scarcely be felt, when a vein in each arm was opened, but no blood could be made to flow ; a hot-water blister was applicd to thc pit of the stomach, friction with dry cloths were

assiduously employed from the first; after the application of the water-blister a common blister of cantharides was applied to the præcordia; the vomiting, spasms, and anxiety nevertheless continued to increase; he complained grievously of the heat employed to recover the natural warmth of his body; 150 drops of laudanum with two ounces of peppermint were given him, which he soon vomited; the hot-bath was repeated, to which was added a spirituous infusion of chillies, a tea-spoonful of warm spirits and water was given him every two or three minutes, and at half past 2 o'clock 60 drops of laudanum, which were twice repeated, at an interval of 15 minutes, three or four table spoonfuls of water, acidulated with muriatic acid, were given him, after which there was no vomiting nor spasms. The man died. On dissection, some degree of inflammation at the cardiac orifice of the stomach was discovered.

Dr. Daun's next patient was treated on the same principle, that is scruple dose of calomel with stimulating mixture; 20 ounces of blood were abstracted; this patient also died. Slight inflammation among the circular rugæ of the stomach, and inflammation of the omentum, appeared on dissection.

The following case, therefore, which Dr. D. treated, was bled the moment he entered the hospital, to the extent of 32 oz.; the patient, it is said, exclaimed, immediately after this depletion, that the bleeding had saved his life; which, from his feelings, though he cannot describe them, he is certain must otherwise soon have terminated; spasms returning with retching, half an hour subsequent to the abstraction of blood, Dr. D. again bled the patient to the extent of 36 ounces; hence 68 ounces of blood were abstracted within the half hour; the pulse continuing to rise all the time, the patient expressing himself to be relieved in even a still greater degree than he had been by the first bleeding. It will be sufficient to add, that this patient recovered. Dr. Daun, in consequence, makes the following sensible remarks on the use of the lancet: "I beg to give my testimony in favour of bleeding in the treatment of that very fatal disease. So far as my experience enables me to form any opinion, bleeding, early and copious bleeding, is the only means of cure yet discovered, on which any reliance should be placed. The total cases of Spasmodic Cholera

whieh have occurred in the 89th Regiment up to this date, does not exeeed 11; of that number five have died, and six have recovered: all exeept one, Reynold, whose ease was given in the journals for June, were bled eopiously, that is to say 50 or 60 oz. In those who died either bleeding was not had reeourse to or delayed too late, and when none or very little blood eould be made to flow from the ineised veins." The following pertinent remarks are made by Dr. Daun on the injudieiousness of using stimulants, deduced from his own praetiee, whieh was evidently at the first erroneous, in combining them with sedative doses of calomel. "The propriety indeed of giving stimulants and spirituous medieines would seem rather *questionable*, if we eonsider, that in by far the greater number of eases of Spasmodie Cholera, there exists more or less of *inflammation* and superfieial *ulceration* of the stomaeh or duodenum, or both."

In the ease related by Mr. Dyer, the patient had a small quantity of blood abstracted. Calomel washed down with brandy and water; laudanum was given. The patient died.

The first case is treated with eomphorated mixture, combined with æther ʒ ss. and ol. menth. pip. gtt. x.; leeehes were applied to the temples, and some flannels were applied to the arms, ehest, and extremities. The bleeding was also repeated, and a simple dose of ealomel with two grains of opium. On the 27th, the leeehes were again repeated; a purgative mixture, in whieh tinet. eardam. was blended, was given. On the foregoing treatment the patient reeovered.

Mr. Annesley being engaged with a very bad obstetrie ease did not preseribe in the first instanee; in the next, the patient who had taken a preseription of Dr. Walker's and Mr. Conwell's stimulants with opium, died. On disseetion, the duodenum and jejunum were found of a light rose or flesh eolour; the intestinum ileum was darker; there was eonsiderable eongestion on the external coats of the small intestines; dark bloody spots were found between the eoats of the stomaeh; the eonvex surfaee of the right lobe of the liver was of a purple or mottled hue; the whole of the posterior portion of the lungs had preeisely the appearanee of a solid mass of bruised bloody flesh; and when eut into, had a flesh-like structure; bled profusely dark-eoloured blood; the blood

vessels of the pericardium turgid; the vessels of the pia mater were exceeding turgid, and of a much darker colour than Mr. Annesley had ever seen them before; the appearances were exactly the same as are found in apoplectic subjects.

The following case was a Sepoy. A blister was endeavoured to be raised with nitric acid; æther ʒ i. tinct. opii ʒ i. aquæ cinam. et aquæ pur. ℥ i. were given, as well as warm frictions, warm brandy and water, administered frequently. This patient died. Dissection exhibited the same inflammatory symptoms.

The next patient was bled, probably from a supposition of inflammation of the brain having supervened. He died, and evident marks of inflammation of the brain were found on dissection. The subsequent patient was bled repeatedly, and anti-spasmodics proved remedial. Mr. Annesley therefore remarks with respect to bleeding, that in every instance where it could be practised, he was successful. He considered that it removed spasm, prevented venous congestion, and gave a salutary check to the progress of the disease. Dissections exhibited, says Mr. Annesley, in every case venous congestion.

In the report of cases from Dr. Campbell, the first patient died. The nature of his prescriptions are not given. He was bled; but it appears the patient had been one day attacked before he reported himself. The next patient was attacked before day-break, but did not take medicine until 10 A. M.; he appears to have been very judiciously treated by bleeding, and anti-spasmodics, but being exhausted before these measures were carried into effect, he died.

Mr. Serjeant gives the detail of one case, in which laudanum, ammonia, and brandy, with infusion of ginger, were given, and an opiate injection thrown up, but without beneficial effect.

Dr. P. Scott communicates the history of one case, to whom was given the anti-spasmodic mixture, recommended by the Medical Board, and subsequent small doses of calomel and laudanum in brandy and toddy; turpentine frictions were used; the patient died. On dissection, some venous congestion was observed in the stomach; the omentum was extremely vascular; the venæ cavæ and subclavian veins were quite turgid, as if strongly injected.

Mr. Scarle's first two cases died; in which small doses of calomel and laudanum, and spt. ammon. were the principal articles

prescribed. The abstraction of blood could not be obtained from the first case, in which spirits and water were given with a view to excite arterial action; both patients died. On dissection, a circumscribed inflammatory flush was observed on the inner coat of the stomach; the small intestines were thickened throughout and slightly inflamed; in short, livid, and so were portions of the colon; there was also general venous congestion. The next patient admitted, was bled to the extent of 16 ounces from the arms, and four ounces were abstracted from the temples; scruple doses of calomel with a grain of opium were next given; this patient recovered.

The case of Dr. Rogers is drawn up by himself. He took a draught composed of tinct. opii, ammon. comp. aa. gtt. l. spt. Gall. ℥ i. This was repeatedly taken and as repeatedly rejected, the stomach evidently incapable of bearing the stimulus of the brandy. He was bled on the instant 30 *ounces*, usque ad syncope, and a blister was applied to the epigastric region. Dr. Rogers is of opinion that the Cholera, from the experience of the symptoms on himself, is a disease *sui generis*, allied to the species of congestive Typhus Fever, recently so ably described by Dr. Armstrong in his Essay on Fever. Dr. Rogers ascribed (under Providence) his recovery especially to bleeding.

The last report is from Dr. Aitken. His patient took the Board's anti-spasmodic mixture, large doses of calomel, with brandy and water, castor oil, jalap, &c. The patient died. Dr. Aitken expressed his regret that he had not given on the instant of attack a large dose of calomel, as a likely means, along with the anti-spasmodic mixture, of changing the action of the stomach and intestines.

Such are the reports of gentlemen on the Madras establishment, and such the result of treating this disease on that principle set forward by Dr. James Johnson, the early restoration of balance of the circulation and excitability by cordials and stimulants; or by Messrs. Scot and Orton's principles of diminished nervous energy: both theories exceedingly plausible and interesting, but diametrically opposed to clinical practice. My readers will observe, after the perusal of my letter, that I ascribed my failures to their adoption; yet in opposition to such evidence and on such powerful authority, by which that letter was circulated,

exhibiting the effects of the disease to be inflammatory, was the practice I have described pursued.

In February, 1831, a volume of Medical Reports, containing observations on Cholera, Dysentery, &c. was printed at Madras, entirely with the laudable view of advancing professional research, by exhibiting the results of different remedial agents in particular diseases, and their application in different situations and circumstances. The four first papers consist of Reports on Cholera, from the pens of Messrs. Lister, Thomson, Lawrance, and Scarman. I lament to see the same erroneous views on the nature of this Epidemic, and in consequence failure in the treatment.

Mr. Lister has divided the Epidemic into two forms, the "low," and "Cholera with excitement," the former, we should suppose, to justify him in the use of stimulants. But how he can designate that form of Cholera "low," which is distinguished by the constitution struggling for re-action, is to me inexplicable. For he says: "my observation in the very low cases respecting the 'stage of excitement and re-action,' agree with those of Orton: when cases have lingered, I have generally noticed a tendency towards recurrence of the low symptoms, and a great struggle for re-action. It is during this struggle that the inflammation of the stomach, heat of skin, &c. alluded to above, take place; and, as will be seen in the last of the following reports, a timely bleeding has occasionally relieved this state. I have not observed 'an evacuation of bilious fæces,' so soon after recovery from the low form of Cholera as Orton mentions."

We should indeed suppose that few men, having such pathological views as the foregoing, in a disease wherein, during this struggle, for re-action, inflammation of the stomach and heat of skin take place, would recommend the adoption of stimulants, for his system of treatment is thus set forth: "Strong external and internal stimulants were used; blisters were applied to the head and stomach; mustard poultices to the calves of the legs. Bags filled with hot sand were of great use in checking the sweating, and producing warmth. Strong opiates with sulphuric æther, peppermint, brandy, and other stimulants, were given internally, also large doses of opium and calomel."

Is Mr. Lister sufficiently aware of the dangerous character of that affection called inflammation of the stomach? I would seriously suggest to him the expediency of turning to any writer on the diseases of the human frame, and ascertaining received opinions on the nature and treatment of gastritis. He may say, perhaps, that when he recommended the use of stimulants, gastritis had not taken place. But because it had not taken place, would he produce it, in order to have the honour of effecting its cure?

The morbid appearances exhibited on dissection of Mr. Lister's patients, are thus described: "The vessels of the brain always turgid, often to a considerable degree. In one case, about three drachms of fluid were found in the ventricles. The lungs always gorged, to a greater or less extent, with black blood. The right auricle and ventricle of the heart, especially the former, greatly distended with black blood. The left side of the heart nearly empty, sometimes a little dark blood in the auricle. The omentum generally forcibly drawn down into the pelvis. The external surface of the small intestines, of a highly vascular appearance; very little congestion of the liver, sometimes none at all."

So much for Mr. Lister's low form of Cholera. In that of excitement, we find him suggesting bleeding, because in every one of these cases blood was taken from the arm, and generally with the greatest advantage. But my readers will share in my astonishment when they find that he also uses stimulants, when "excitement," or, as we suppose he really means, "re-action" had taken place. "Internal stimulants and opiates (he says) were always necessary, sometimes to a considerable extent, but much less so than in the low cases. The treatment of the convalescents was the same as in the low form."

We are, however, surprised at perceiving that the only three cases Mr. Lister gives, are treated without stimulants; and we need not inquire with what effect. I shall quote them in full.

"The three following cases may be worth inserting here, from the simultaneousness as well as great similarity of the attacks. May 22nd, William Tidd, F. Meyers, and Corporal Moore, all robust men, were admitted, within ten minutes of one another, about 1 P. M. The similarity of the symptoms was most surprising. Two of them had been vomiting and purging a clear watery fluid

for some hours, and had slight spasms; the other had green watery evacuations, and the most excruciating spasms of the abdomen. They had all within the last half hour been seized with violent delirium; the pulse was quick, skin hot, and thirst so intense, that they were continually craving for cold water, and were obliged to be held down to prevent their running in search of it. They were each bled to about ℥ xxxvi. with much relief; but the delirium continued for about an hour afterwards: and it was necessary to take a pound more of blood from the man who had the violent spasms, in less than half an hour after the first bleeding. Their heads were covered with blisters, and two of them had blisters to the stomach, in consequence of the continuance of the vomiting. A large dose of calomel and opium was given; and, in less than three hours, they all fell into a refreshing sleep. Two of them had a little cold sweating and low symptoms next day. They were all discharged before the 2nd June. There was not the least reason to suspect, that these men had been drinking to excess, before they were attacked."

In a subsequent report, Mr. Lister favours us with a further account of his practice, and gives a detail of five cases, which will be found in the Appendix No. II. All these cases, it will be perceived by reference, were treated with bleeding, stimulants, and calomel and opium; and they all died; excepting one, who very fortunately did not take the stimulants until the disease had been subdued previously by depletion and sedatives.

Who would suppose that a gentleman holding the following opinion on post-mortem examinations in this Epidemic would ever think of using stimulants? "Many imagine that, as the mental faculties continue so long nearly perfect, the brain is not oppressed, and for the same reason neglect to examine the head after death. For my part, I have never seen a post-mortem examination in this disease, where there was not congestion of the brain, and generally to a considerable extent. I think the majority of cases, where serous effusion is found, are, like the last one, lingering. The same is the case in apoplexy. If a person dies suddenly of the latter disease, turgidity of the vessels of the brain, or a rupture of one of them, is found; but should he linger a day or two, there will be more or less serous effusion. The reason of this is evident. The effusion of serum from the blood is a process which

requires a considerable time for its accomplishment, whereas vascular turgidity may take place in a few seconds."

We have in the next report six cases detailed by Mr. Thomson. They are treated in the same way as the foregoing, viz. by bleeding, calomel, and opium, with stimulants: they all die, except two.

The third report is from Mr. Lawrance. For the sake of brevity, I shall merely quote what he says of his treatment. "The plan of treatment pursued, and which from experience was found most beneficial, was of the most stimulating kind. It consisted in giving a drachm of æther and the same quantity of laudanum immediately on admission, and repeating it at short intervals with a diminished quantity of opium. Brandy and water were given freely; but it was necessary to make it weak, as the patients were unable to bear it strong without vomiting. Calomel was given in scruple doses, when we had an abundance of it; but I did not feel much inclined to repeat it, unless some signs of re-action occurred. Warm sand was the form in which we endeavoured to restore the diminished heat of the body." The following is the result in his own words: "The number of men attacked amounted to 59, of whom 35 died. This includes those actually admitted with Cholera as well as those admitted into hospital for other diseases, and, subsequently attacked."

Mr. Scarman gives a brief summary of his views, which correspond with those of the former gentlemen, but he does not give any cases, and there is nothing in this paper worthy of particular attention.

SECTION III.

BOMBAY REPORTS.

The practitioners on the Bombay establishment, with the exception of one or two, have avoided the use of stimulants; but in those cases where lapse of time from the attack, had brought the system into that exhausted state, these as well as all others proved unavailing; and in others, when convalescent, they were employed as corroborants.

PART III.

DIGEST OF THE REPORTS

FROM THE

MEDICAL OFFICERS ON THE BENGAL, MADRAS, AND BOMBAY ESTABLISHMENTS,

WHO HAVE TREATED THE DISEASE BY SEDATIVES.

SECTION I.

BENGAL REPORTS.

THE first Report was made by myself, and it will be necessary consequently to enter into its history. When this destructive malady broke out in the centre division of the grand army, I was the first to discover it. I was subsequently appointed to an extensive medical charge, viz. the hospital for the reception of all camp-followers, and was also, at the same time appointed by the Most Noble the Commander in Chief, Surgeon to the general officer* and division staff. I had therefore the means of extensive experience; after some failures I at length discovered a principle of curing the disease, which proved successful, and from which I had an opportunity of affording some instructions in writing to an officer on the general staff who was about to quit the camp.

These instructions he took to the Military Secretary of the Right Honorable the Governor General, who being forcibly impressed with the truth of my reasoning, carried the paper to the Marquis of Hastings, and his Lordship viewing it to be of great importance to medical science and humanity, directed it to be immediately published and circulated throughout India.

* Sir Thomas Brown, K. C. B.

The following is a copy of the letter, transmitting it to the Officiating Secretary to Government, Military Department, to be laid before the Vice-President in Council, Fort William, by order of the Marquis of Hastings.

No. 197,
Mily. Dep.t

Sir,

"I am directed by the Most Noble the Governor General, to transmit to you, to be laid before the Vice-President, and under his orders to be sent to the Medical Board, or otherwise put in speedy circulation, 32 copies of a letter transmitted to this department by the Adjutant General of the Army.

"2nd. In order to accelerate as much as possible, the diffusion of the valuable information contained in Mr. Corbyn's letter, at a time when the Epidemic appears to be so generally prevalent, his Lordship has caused a supply of the printed copies to be sent direct to the Ceded and Conquered Provinces, and to the Benares and Patna division of circuit, as well as to the residents at foreign courts, and the Governments at Fort St. George and Bombay. The Adjutant General also has circulated copies to all the divisions of the Army.

"3rd. A copy of the circular which accompanied the copies circulated as above, is subjoined for information and record."

I am, &c.

(Signed) J. YOUNG,
Secy. to the Govr. Genl. Mily. Dept.

Head Quarters,
Camp Eritch, on the Betwa,
30*th Nov.* 1817.

(CIRCULAR.)

Sir,

"The Most Noble the Governor General commands me to inform you, that the Adjutant General of the Bengal army has transmitted to this Department, printed copies of a letter from the medical officer in charge of the native field hospital, with the centre division of the grand army, relative to the treatment which has been found

most efficacious during the prevalence of the alarming Epidemic, that has lately visited the army in its course through the provinces subject to this presidency.

"2nd. His excellency the Governor General is of opinion, that the speedy diffusion of this little tract, by communicating at once the result of that Epidemic which has been slowly acquired and dearly purchased in this camp, may be the means of diverting much misery and distress. His Lordship has accordingly commanded me to request, that you will have the goodness to make such use of the copies of Mr. Corbyn's letter herewith transmitted, as shall appear to you best calculated to meet the object which his Lordship contemplates."

I have, &c.

(Signed) J. YOUNG,

&c. &c. &c.

The following is the document alluded to :—

MY DEAR SIR,

"In compliance with your request to give you instructions for the treatment of the disease which prevails in camp, from the circumstance of your being frequently detached from the army without medical assistance, I give you a statement with much pleasure.

"The symptoms are as follows :—Violent vomiting and purging of watery matter ; spasmodic cramp in the extremities, extending to the abdomen and muscles of the chest ; a collapsed countenance ; the pupil and the white of the eye covered with a thick film ; a suffusion of blood and turgidity of their vessels ; the eye at length sinks into the socket and immediately becomes fixed. The extremities now become cold, and the pulse is not to be felt, and indeed the energy and action of the heart are considerably diminished.

"The first man I saw thus affected was treated with three grains of calomel and a quarter of a grain of opium every two hours, with frequent draughts of brandy and water, and other stimulants ; the man died, and I opened him on the same evening. I found the stomach partly filled with muddy water ; the bowels, were empty and considerably inflated with air ; hardly any bile in the gall-bladder, none in the biliary ducts ; there was general inflammation of the bowels, liver, stomach, and lungs.

"These were indications to follow a directly opposite mode of treatment; consequently on assuming the charge of the native hospital, for the reception of camp sick of the centre division of the army, on the 16th of this month, one hundred and ten patients were admitted with the symptoms I have described. I immediately gave to each patient 15 grains of calomel, which I dropped on the tongue, and washed it down with 60 drops of laudanum and 20 drops of peppermint, in two ounces of water. Before I go further, it will be necessary to mention to you, that laudanum in a large dose of 60 drops is not a stimulant, but a sedative, whereas laudanum from 15 to 20 or 30 is a stimulant; the former produces sound sleep, removes pain and irritability, whilst the latter excites considerable uneasiness and convulsive startings. It will appear the more remarkable to you, when I also mention, that the variation of a dose of calomel has the same effects. Calomel, in a dose of from 5, 8, to 10 grains excites lassitude, sickness, irritation of the bowels, and, on account of its being a stimulant, acts as a good purgative; but in a dose of from 15 to 20 grains it is a sedative, allays vomiting, removes spasms, sends the patient to sleep, and produces one or two motions.

"You will now observe on what principle I treated my patients, not on a plan of giving powerful stimulants, but on one which at once removes the irritability and spasms, composes the stomach and bowels, produces sleep and tranquillity of the mind, excites the secretion of the liver, and prevents the progress of the inflammation. On the second day, it was, indeed, a consolatory sight, to observe the wonderful change. The vomiting and purging had stopped, the spasms removed with general moisture on the skin; they had experienced sound sleep, and the pulse had returned to the wrist. I now gave 30 grains of jalap, which effected one or two bilious motions. Of the one hundred and ten men, I lost only two, and those were decrepid aged men, in whom the vital energies were at once extinguished. The remaining one hundred and eight I had the good fortune to see all recover.

"In the treatment of Europeans, however, I should strongly recommend copious bleeding, and never less than 20 grains of calomel with 60 drops of laudanum, and 20 drops of peppermint in two ounces of water: and on the spasms attacking the abdomen,

the application of a large blister; should the blister fail in drawing, and the blood not flow from the veins, immersion in the warm bath will have the beneficial effect; should the warm bath not be procurable, warm frictions and pots of warm water thrown over the patient, will produce an equally favourable result, in bringing about the re-action of the circulating system.

"When the purging and vomiting are incessant, as well as violent, we ought never to be alarmed in giving as far as 80 drops of laudanum, with 20 drops of peppermint, and 20 grains of calomel, and injecting 40 drops of laudanum in congee by enema. A few hours determine the safety of the patient, therefore those few hours must not be lost in an undetermined manner, and by small and useless doses. After the first attack is over, that is after three or four hours, if there is much spasm and irritability remaining, the dose of calomel and draught must be repeated; the patient will then fall into sound sleep, and awake nearly recovered. The after-treatment will only be, to keep the bowels regularly open with calomel and jalap, and to give occasionally 60 drops of laudanum to procure sleep. It is however to be remembered, that it would be an error and do considerable harm, to bleed in persons who are weak, worn down by disease, and aged.

"The most urgent symptoms in this disease, are violent thirst, and dreadful sensation of burning heat in the bowels and pit of the stomach. The frequent and lamentable call for cold water should never be satisfied, for I observed many unfortunate camp-followers, who had died in the act of drinking: I therefore gave warm congee, and, by the means of sentries, prevented any water being taken into the hospital. Hiccough is not a dangerous symptom in this disease, for there was hardly a patient recovered without suffering this spasmodic irritability.

"I am of opinion, that unless a patient takes these remedies within six hours after the attack, the case is hopeless; at least, I only recovered 10 patients with a regular form of the disease, after a greater lapse of time, and in those the symptoms were peculiarly mild.

"It is of the greatest importance to bear in mind the necessity of giving calomel in powder, instead of pills, for I have known many

instances where pills were passed through the patients in the same state and form they were taken into the stomach. This point therefore is of such high importance, that in Fever, Dysentery, but above all in this complaint, of which a patient is carried off in 12, at furthest 30 hours after the attack, that it becomes necessary to affect the system immediately; otherwise, if this point should be overlooked, the chief object in the operation of the medicine may be frustrated, and the patient lost. It is on this principle I recommend laudanum in preference to opium, one is directly active in its operation, but the other has to undergo the process of dissolving; or perhaps, never dissolving, passes through the system in the same state it was taken into the stomach, without producing any effect whatever. I am so convinced of what I now assert and recommend, that for the last three years, I have never once used any medicine in the form of pills, and I look back to the day when I first discovered this error in practice as one great improvement in the treatment of acute diseases. I have to add, that my reason for using peppermint in co-operation with laudanum, in so large a quantity, was its known efficacy in expelling air from inflated bowels and stomach; this effect I have always found it to have in the most desirable manner.

"That this disease is not infectious, I am perfectly convinced. All my attendants on the sick have escaped the disease; and I have myself, more particularly, at all hours of the day and night, respired the atmosphere of a crowded hospital, with impunity. But, I fancy, there has been a combination of causes, and perhaps one of the principal was the sudden changes of the atmospherical temperature: for I never knew the thermometer vary so much as it has this season. In the morning at day-break, it stood at 52°; at 1 o'clock P. M. at 96°, a variation of 44 degrees in six hours and a half."

(Signed) FREDERICK CORBYN,

Assist. Surgeon,

In charge of the Native Hospital, Centre Division of the Army.

Camp, Eritch,
Nov. 26, 1817.

The first opinion I shall examine will be that of Mr. Jameson, the Secretary to the Medieal Board, who summed up the several Reports from the medieal gentlemen on the establishment. He observes: "The great share whieh the stomaeh and small intestines have in their disordered aetion, is shewn by the manner in which the fluid is ejeeted, and by the appearance observed after death. For it was frequently remarked, that the eontents of the stomaeh were thrown out with violence, at a time when the abdominal museles were in a relaxed state; and when, therefore, the spasmodic contraetion was elearly referrible to the organ itself; and after death its eoats were found turgid, *inflamed*, and even *ulcerated*, and partially mortified, evidently from the high degree of exeitement and inordinate aetion into whieh it had been thrown during life. There is none of that horripilation, dry skin, and shivering, which in the cold stage of intermittents are supposed to arise from, and mark the *presence of spasm**. *The skin on the contrary is shrunk, clammy, and bedewed with perspiration*, as if the mouths of all the exeretories were thrown wide open†. In like manner the suspended state of the secretions seemed to depend mainly on inaetion; since the suppression or retention of urine, a most remarkable and almost eonstant symptom of the disorder, was not attended by any pains in the kidnies and ureters. Disseetions shew, that the appearance of the liver was very various; and from this we may eonelude, that the general turgidity of that viscus, as well as of the spleen, was merely owing to the general retrogression of the blood, whieh filled the cavities and swelled all the great trunks."

Arriving at the treatment, Mr. Jameson remarks as follows, on the use of stimulants eombined with large doses of calomel and opium. "At first, laudanum, calomel in large doses; brandy, and the most powerful internal and external stimulants were chiefly depended on; but when these were found unavailing, and an examination of the bodies of those who died, showed great venous aeeumulation in the eentre, and *inflammation of the stomach and intestines*, a new praetice eame into use."

From henee, those gentlemen, who have been supporting the system of diminished nervous energy and evolution of oxygen,

* Mr. Jameson is assuming the theory of Cullen

† I conceive this to be the case in effusion from inflammation.

will, I trust, now be convinced of the sandy foundation of their systems*. But Mr. Jameson proceeds to shew what this new system was, and the efficacy of bleeding.

"Venesection was resorted to, and in many cases of Europeans carried to the greatest warrantable extent. When the patient was of sound habit, and seen in the early part of the disease, the practice was to tie up his arm, and allow the blood to flow, until from 12 to 20 or 30 ounces were abstracted. In some instances, where the violence of the spasms and severity of abdominal pain seemed to indicate it, or where benefit had been evidently derived from its use in the first instance, the bleeding was repeated after an interval of some hours."

Mr. Jameson now adverts to the failure of this remedy; "where the blood would not flow freely, where it merely trickled down in drops, and where it might spout out freely for a few moments as the muscles of the arm were violently contracted by spasm, and then entirely cease as the patient fell into a state of collapse. It must be confessed, however, that the ill success of bleeding at this time was greater in appearance than in *reality*; for the persons on whom it was generally tried were patients in the general hospital, composed of various classes collected from the town and shipping, and seldom coming under treatment until some hours after the commencement of the attack. In H. M. 59th Regt. in which the patients were usually seen at a very early period of the disease, the practice was more successful; since of 19 men admitted into hospital, between September, 1818, and March, 1819, only three, or not quite one in six, died; whereas of the promiscuous cases of the general hospital, the deaths were in proportion of six to one recovery, although in both hospitals, the mode of treating the patient, was precisely the same."

Such cases as appeared in the general hospital, frequently occur in camp and cantonments. Men, before they enter hospital, begin to

* Let it be understood by my readers who have not been in India, that Mr. Jameson, the compiler of the Reports, had no practical experience in the treatment of the disease; in fact, as far as clinical practice went, he was a stranger to it: he is therefore writing with all the Reports before him unbiassed. He was distinguished among his literary friends for great intellectual discernment; his remarks therefore are deserving of considerable attention.

doctor themselves, as it is said, with hot brandy and water, and various other stimulating means, by which they hasten inflammation. This has been too often the cause of the failure of every remedy, and the medical attendant has the painful task to witness nothing but death instead of recoveries; and though his own measures have been the most energetic and judicious, he is apt to conclude that the disease is beyond the aid of medicine.

But to return to Mr. Jameson. He exhibits the necessity of bleeding from the result of dissections. "On laying open the abdomen of such as had lived some time after the commencement of the attack, especially of Europeans and the stoutest natives, a different set of appearances was brought into view. The omentum and mass of intestines were often found displaced, and preternaturally vascular, with partial adherence between the diaphragm, liver, and surrounding viscera. The colour of the intestines varied from deep rose to a dark hue, according as the increased vascular action had been arterial or venous. In some instances the outer surface of the stomach likewise was florid, and its veins turgid, with dark blood; but this was not so in the generality of cases. This organ was, however, much contracted, and its substance hard and frequently thickened. On cutting into it, it was found sometimes empty, sometimes partially, and at others largely filled with fluid of various colours and consistence, thin and transparent, milky, green, dark, grumous, or muddy. Sometimes this fluid was black, like lamp-black, sometimes it consisted of pure blood, and at other times blood mixed with bile. On removing this, the inner surface was frequently seen lined with coagulable lymph, bloody gelatine, or a muddy, glary, viscid matter, which, on being washed away, brought the highly inflamed coats into view. Of these the appearance was various, generally they were crossed by streaks of a deep red, interspersed with spots of inflammation made up of tissues of enlarged vessels, sometimes the inflammation was florid and bright-coloured, so as to give the whole inner surface of the organ the appearance of a minutely injected anatomical preparation. In some instances ulceration had begun, and the villous coat was partly abraded; in others incipient mortification had occurred. On cutting into the intestines, the smaller guts were observed to be more inflamed than the larger. The duodenum

was generally similar in morbid appearance to the stomach, corrugated, inflamed, with florid or deep red patches and streaks. In cases of several days' standing, the inner coat of the small guts was ulcerated, and they were filled with sanies, having portions of lymph floating in it. The colon and rectum were frequently contracted and inflamed. The inner surface of the rectum, near its termination in the anus, was in some instances abraded, in almost all highly vascular. The appearance of the liver was very various. In most cases, and in nearly all young plethoric subjects, it was enlarged and gorged with blood, which flowed profusely, and sometimes spouted up on a scalpel being plunged into any part of it. The spleen was uniformly enlarged and distended with blood. The urinary bladder sometimes partook of the general inflammation. In the thorax, the same marks of great internal accumulation were present. The heart and great blood-vessels were stuffed with clotted blood, and the lungs were black, collapsed, and preternaturally heavy. The inner surface of the œsophagus was sometimes inflamed and ulcerated."

Speaking of the brain, Mr. Jameson observes: "In some cases there were marks of venous congestion and incipient inflammation. The sinuses, and vessels leading to them, were turgid with dark blood, partial adhesions and deposition of lymph were observed to have taken place between the dura and pia mater, near the coronal suture, towards the occiput. Serous effusion likewise occurred in a greater or less degree between the membranes, or in the ventricles. In one or two instances, the sinuses had given way from over distention, and a great quantity of blood was found poured out on the surface of the brain. In cases of persons affected with stupor previously to death, a quantity of fluid escaped immediately upon puncturing the dura mater, and much serous effusion had taken place throughout the cavity of the brain, with partial thickening and inflammation of the meninges."

Such were the results of the examination of one hundred communications, which Mr. Jameson received from medical men on the Bengal side. What stronger evidence do we require to prove that the disease is inflammatory? And if inflammation is present, surely the indication of cure is simple.

On the use of calomel, we have the following commentary: "Calomel was given in doses of from 10 to 40 grains, and, unless when rejected immediately on being swallowed, repeated at intervals of four and six hours. When the calomel was thrown up, it was repeated every little while ; the patient being in the mean time, kept from drinking even the smallest quantity of fluid. This was undoubtedly the mode of practice most successful in Calcutta. The majority of medical men at the presidency concurred in thinking that it was only beneficial in so far as it tended to enlarge the biliary ducts, and to promote the regular alvine discharges. Others again no doubt believed, that it would stay on the stomach, when every thing else was rejected; and reckoned upon it as their chief means in the cure of the disorder. It was necessary to assist this operation by the administration of repeated doses of compound powder of jalap, infusion of senna, and other saline and resinous purgatives ; but as the system, during the whole process of throwing off these depraved secretions, was in a state of high excitement and disturbance, and apt to sink beyond recovery from the slightest error in practice, great discrimination was required in the mode and time of administering the cathartic medicines. The foul dry tongue, parched mouth, thirst, irritation of stomach, hurried pulse, hot skin, and general feverishness, which marked this stage of re-action, sometimes continued many days, and were treated with the remedies found most readily to relieve similar symptoms in common cases of Fever."

The following remark on the efficacy of laudanum is given in a note: "Patients, European and native, recovered under the lancet, and large doses of opium. Laudanum was usually given in doses of 100 or even 200 drops, or two drachms at a time. A sickly native took 600 drops in one night, and recovered, and a gentleman at a distance from Meerut was saved from impending death by swallowing 400 drops in two or three hours. It never in the largest quantities induced affection of the head."

I have thus made large extracts from Mr. Jameson's work, which enables me to be less tedious in extracting from those Reports which I have been so fortunate as to receive. I shall commence by noticing, that from Mr. Superintending Surgeon

Reddie, a gentleman, who had been placed in situations, which not only gave him great opportunity of seeing the extensive ravages of the disease in various parts of India, but afforded, to a mind highly gifted, and improved by a finished education, an ample scope for taking a comprehensive and enlarged view of the practice of the great body of medical gentlemen, who had served within the different circles of his superintendance. This gentleman reports, that when Cholera broke out in Rajpootana, little variation of treatment occurred: blood-letting was generally practised, and afforded marked relief to spasm and anxiety, when had recourse to at an early period. No buffy coat is stated to have in any instance appeared, nor rising of the pulse speedily to have followed. Calomel was not given in larger doses than 15 to 20 grains, and seldom repeated more than three or four times. Ptyalism generally occurred on the 4th day. When the disease had abated, opium and camphor were given in moderate doses, and subsequently purgatives. No beneficial effect was experienced from external application.

Mr. Reddie states, that in reply to an inquiry respecting the use of diluents, or evacuants of the stomach, he was informed that a dilute solution of muriate of soda had been generally used in the corps of Irregular Horse, commanded by Lieut. Col. James Skinner, with happy effect; and that after vomiting, opium was given, and no other medicine used.

The following communication is from Col. Skinner himself, in a letter, dated October 6th, 1828, addressed to Major Cartwright. "Warm salt and water is given until the stomach is well cleared; and then small doses of laudanum and peppermint, or the essence of cardemoms, when the irritation of the stomach is stopped; afterwards, violent thirst comes on, for which boil some anise, and when cooled, give it as often as required by the patient. A great number were cured by this method. The natives of Indore cured a great number; I may say, the only medicine they had was the juice of onions and bazar arrack. It was also practised at Mhow, and a great number of men were cured in the camp; but with salt and water as above, I did not lose a single man in my corps."

I can have no doubt myself, but the modus operandi of the salt was purgative, and that the repeated doses of laudanum

appeased the irritability, sinee we have now ascertained the disease to be inflammation; but that it was not so violent in some plaees, as in others, is a faet well established; and I have no doubt the disease, with Col. Skinner, at this time, was mild—a supposition eorroborated by a subsequent eommunieation from Mr. Reddie. A report from Mr. Primrose, the Surgeon of the 19th Regiment, is forwarded. "Mr. P.'s testimony, (adds Mr. Reddie,) eonfirms the aceount given by Col. Skinner to Major Cartwright, of the solution of eommon salt having been generally exhibited, to eleanse the stomach previously to the administration of opium, and eorroborates the Colonel's assertion of all having reeovered. A Surgeon on the Madras establishment, I believe Mr. Wilson, who had for a short time medieal eharge of the Irregular Horse, was in the habit of giving eamphor, and reeommended the employment of it to Mr. Primrose, perhaps from the praise bestowed upon the mixture of that substanee with ealomel by Whitelaw Ainslie; but it is evident that from the dose of five grains, every three hours, little effeet eould have followed in sueh an aeute disease. I am sorry to remark, that, by Mr. Primrose's letter, of 13 eases, whieh oeeurred in the 19th Regiment, 6 had died."

Mr. Reddie eoneludes this report thus: "I beg again to express my eonvietion, on the ground of the observation I have had opportunity to make, on the oeeurrenee of the disease in the left division, during April and May last, and in the reeent instance, as well as others, whieh I have easually seen, that the expeetation of allaying the morbid aetion of the stomaeh by nareoties and stimulants, without relieving it from the load of its noxious eontents, has in most instanees proved vain."

Mr. Primrose reports, however, that he tried the effeets of emetics: "In one ease I gave warm water with a view of eleansing the stomach; but the man beeame soon so mueh worse, that I lost no time in giving him two grains of opium with the eamphor; he recovered." Of the use of ealomel, opium, eamphor, &e. Mr. P. remarks, that on the admission of patients, "I immediately gave to eaeh of them two or three grains of opium, and five of eamphor, and repeated the opiate, if the vomiting made it necessary; the eamphor I gave every three hours, with eontinued fomentations to the extremities of hot-water, till warmth returned. I also gave 15

grains of calomel with the opium, and they all had warm congee to allay their thirst, which soon became considerable. In a few hours, the pulse returned, in most instances, and the body became warm; the sickness only in one case continued after the opiates, and in that case, blisters applied to the stomach succeeded in removing it. All the men appeared recovering fast the following day after their admission into hospital."

Mr. Halket's mode of treatment, and its success are thus detailed: "The treatment adopted in this disease was bleeding, when the patient was brought in time, and with a good pulse; which in most cases relieved the oppression about the stomach and bowels: the blood never showed the buffy coat, neither did the pulse seem to rise much, on taking away blood. After venesection, from 12 to 15 grains of calomel, about five grains of camphor, with from 70 to 80 drops of laudanum, were administered, and the doses repeated at the expiration of two or three hours, when the symptoms did not abate. Opium, in doses of from 2 to 3 grains, was given in place of laudanum, when the irritability of the stomach would not bear liquids. In the favourable cases, some of the patients fell asleep after the first dose, and others after a repetition of it; they all awoke with a warm perspiration on them; the vomiting and purging had ceased; the cramps entirely removed; afterwards calomel in small doses was given at intervals of three or four hours, and I found that those whose mouths were a little affected, recovered soonest. A dose of jalap or some other aperient was the after-treatment, for the purpose of keeping the bowels regular." On Mr. Halket and the other gentlemen's reports, Mr. Reddie, thus comments: "The corps under charge of Mr. Halket, had fewer casualties from Cholera than the others. It is but justice to the medical officers to state, that the great proportion of deaths took place soon after admission."

Mr. Nicoll describes the success of his treatment, by giving the result of one case. "He swallowed a scruple of calomel, and 80 drops of tincture of opium on admission, which remained on his stomach, and appeared to soothe the irritation of the organ, as he had no return of vomiting or retching; he afterwards took the aromatic spirit of ammonia, with oil of peppermint, slightly diluted with water, every half hour, until the heat returned, and in the

evening he had no complaint but weakness; he took a dose of castor oil next morning, and required no farther medical aid. I had two cases in the Sirmoor Battalion, both of whom recovered from bleeding alone."

Messrs. Hall and Castell communicate what was deemed a desideratum; a remedy for alleviating the agonizing sensation of thirst, viz. the spts. ammon. not in the doses to act as a stimulant, but to produce diaphoresis. Mr. Hall observes, "In the treatment of Cholera, in this last visit, the only thing which has occurred to me, and seems worthy of notice is the spts. ammon. comp. Mr. Castell and myself gave this medicine at first without much confidence, and in small doses; we however, from observation, discovered, that it had a very wonderful effect in raising the spirits, cooling the distressing burning sensation in the stomach, allaying thirst, bringing on diaphoresis, and consequently preventing vomiting. It was given, combined with the usual doses of laudanum, and repeated every half hour, until the pulse returned to the arm, and heat to the extremities. It was so grateful to the sick, particularly in allaying thirst and removing oppression at the breast, so common in this disease, that the people used to call for it. I do not know any one medicine from which I have seen so much benefit; and I had so much confidence in its operation, that I had at one time thought of giving up laudanum and calomel altogether, in my first step in the treatment of the disease, and nothing but the responsibility which must ensue when we try experiments in the case of life or death of a fellow creature, prevented me from trying it alone. The dose was from 70 to 80 drops, in two ounces of water, and in desperate cases 100." We may infer from Mr. Hall's timidity in respect to deviating from established systems, that the dose was never given uncombined with calomel and laudanum. So small a dose in so large a quantity of water, could not, it appears to me, have been productive of the effects these gentlemen suppose; but that the calomel and laudanum deserve the praise, I think is unquestionable.

The report I am now to notice is from Mr. Gibb, the superintending surgeon of Meerut, who had an insuperable dislike to large doses of calomel, and therefore would never use them himself, and as matter of course, dissuaded all the medical

gentlemen within the circle of his superintendanee from doing the same.

Of the effects of that medicine therefore in this disease, Mr. G. could have had but very limited experience ; fortunate was it for his patients, and those who came into the regiment hospital in his division, that the following was the view he took of the proximate cause of the disease. "Although the disseetions at this station have evinecd considerable traees of inflammation, in almost every instanee, I am still persuaded, that inflammation is generally, if not, invariably the consequence and not the eause of this disease. Had I ever entertained a doubt on this point, the recent experience of Messrs. Thomason and Nieoll, at Kurnaul, would have entirely removed it."

This is very important testimony, indeed, as it at onee directs to that system of therapeutics, which depletes, and is sedative; and the following is a synopsis of the treatment pursued by the different medical men under Mr. Gibb. "Small draughts of hot cinnamon water in the first instanee, a full dose of laudanum (not less than two drachms in severe cases), with a drachm of spt. ammon. comp. or any other agreeably or equally more diffusible stimulant; and this dose to be repeated at shorter or longer intervals, according to the urgeney of the case."

Mr. G. shews himself unacquainted with the therapeutical effeets of 120 drops of laudanum, combined with so small a dose as 60 drops of spt. ammon. comp. diluted, as it must have been in a proportionate quantity of water, in supposing that the latter medicine would act as diffusible stimuli. The utter want of prineiple which is here displayed, in laying down the proximate eause, and thence deducing indications of cure so obviously inconsistent in the treatment of this disease, is astonishing. Mr. G. must have supposed he was combining a stimulant with laudanum, when he preseribed that small dose of spts. ammon. which would, on the contrary, act as diaphoretic ; or he must have believed, if he was prescribing on principles of affinity, that laudanum, in a dose of 120 drops, was a stimulant instead of a sedative. He would not surely preseribe in the same draught a stimulant and a sedative. The above doses, therefore, preseribed by Mr. Gibb, acted as a sedative, and a very powerful one.

He next mentions, that he employed "immediate and full bleeding, when practicable, a warm bath of high temperature or hot fomentations, followed by only frictions of a stimulating nature, blisters to the epigastrium, and finally, moderate doses of castor oil, with a little brandy or any other warm laxative on the abatement or removal of the more violent symptoms."

The treatment therefore was good on the whole. Mr. Gibb introduces the following obvious truth on the treatment of the disease: "that though the most approved means should frequently fail in a disease of such unparalleled violence and rapidity, it ought not to excite the smallest surprise, nor lead us to suppose that our very imperfect art is altogether useless." On the use of emetics, Mr. Gibb says, "that emetics had been given by some of the native doctors, and shewed from the obvious advantage of promoting vomiting in the first stage of the disease, that their practice might, on some occasions, be not only safe but useful; I cannot venture, however, to recommend it." In conclusion, on the effects of blood-letting, Mr. G. thus comments: "It is useless, however, to expatiate on these abstruse operations, and it is fortunate that on those points of most practicable utility, viz. indications of cure, and the best means of fulfilling them, there seems to be little or no difference of opinion, except on the essential particular of blood-letting. Those who had practised it in endemic Fever for the removal of congestion, and the relief of the enfeebled and over-distended heart and blood vessels, anticipated the same favourable results in Cholera; nor has experience disappointed them. Instead of the increased debility, apprehended by others, they have found the whole system restored by it; for blood is seldom procurable whenever likely to prove hurtful."

The report from Mr. Lowe furnishes nothing of great importance, except a communication from Mr. Stephens, one of the Surgeons within the circle of his superintendance. This gentleman observes: "To blood-letting and the use of the warm bath we have chiefly trusted for the cure; and both have been freely used, apparently with the best effect: 30, 40, and even 50 ounces of blood have been taken within a very short period after the attack. In some, though not all, the blood shewed highly inflammatory appearances."

The next Reports I shall notice, will be from Mr. Tytler, a gentleman so eminently distinguished for scientific research and classical attainments, that his remarks are of much importance. He premises his account of the treatment of the disease at Mullye, with the following observations:—

"Whatever stimulants I gave, as brandy, laudanum, æther, hartshorn, invariably produced the same effect, and occasioned so much misery, that the patients usually entreated me to discontinue the use: the only medicine that could be retained was calomel. *The powerful stimulants which have been so much recommended in other places were here not only totally useless but even pernicious. The irritability of the stomach was such that they were constantly vomited, and the thirst was so much increased by their exhibition that (as before mentioned) many patients on whom I tried them at first, entreated me to discontinue their use;* this may account for the very sparing use of these medicines in the above detail. Without pretending to determine whether the blisters, glysters, and warm bath were used according to a just or an erroneous theory, I may observe that their use seemed to do neither much good nor much harm.

"*The most efficacious remedy was certainly phlebotomy,* and it may therefore be proper to add a few observations concerning its use. It may at first view be supposed, that although bleeding be serviceable in the first state, yet that in latter periods of the disease it may be productive of very dangerous effects. In practice, however, this will not at all be found to be the case, for it then becomes impossible to take away blood by the lancet, a vein may be opened, but none will flow, as happened to me in many of the unsuccessful cases, the particulars of which are related above. I therefore leave it to be considered whether it may not be laid down as a kind of general rule, that whenever blood can be drawn from the arm it should be done: whether in those cases, in which it cannot be practised, any blood should be taken away by leeches, is to be determined by future experience. From the viii. and x. cases, and from some others, *I am inclined to think, that the pulse resembles that of peritoneal inflammation. It is rather oppressed than low, and becomes stronger by the judicious use of the lancet; hence in the first stage a pulse seemingly weak*

is not to be considered in all cases as an objection to this practice. Upon a review of the whole, I am inclined (though with diffidence) to draw the following practical conclusions: that in the first stage of the violent attack of this disease, there is an interval of about an hour or perhaps two (I do not think longer), in which the skin is warm, and pulse strong, or at least not really weak. At this time, bleeding is likely to be of great service. It seems at once to relieve the vomiting, and then whatever other medicines may be necessary can be retained on the stomach. If this be omitted, the situation of the patient very soon changes; he becomes so weak and cold, that on opening a vein no blood will flow. In this second stage, it is extremely difficult to say what will be of use. The thirst is still intolerable, and as no liquid can be retained on the stomach, to allay it, perhaps under these circumstances, salivation is the most likely means to relieve these symptoms. The most efficacious means should therefore be used to produce it, large doses of calomel by the mouth and rubbing on the skin should of course be employed. Would smoking mercury or other more violent measures be advantageous? This much is certain, that all those cases alluded to in the above narrative, who were either bled or salivated recovered. Reflecting on the melancholy events of the day, and those preceding, and what very little power medicine seemed to have over the disease after it had reached a certain stage, it appeared to me the glysters of emetic substances, largely diluted with water, might have a tendency to allay the violent thirst by which the patients were so much distressed, and which could not possibly be relieved; but was rather increased by medicine taken by the mouth. I was encouraged to this by the great relief, which such glysters are said to afford to cases of violent Dysentery*."

I find among the public documents, the following copy of a letter from the Secretary of the Medical Board to the address of Mr. Tytler, giving the sentiments of the Board on Mr. T.'s treatment. It is valuable as a testimony of what is the true treatment of this pestilence. The following is an extract.

"The Board desire me to offer their thanks for your clear and valuable description of the Cholera. The varieties put on by this

* See Clark on Fevers and Diseases of the West and East Indies.

dreadful disorder in the quarter coming under your notice correspond with those observed in other parts of the country, during the long period which it has been amongst us; and the practical deduction, which you have drawn, as to the usefulness and proper time of bleeding, in the attack, are confirmed by the analogous conclusion of those who have had the largest experience in combating the disease."

On the efficacy of the sedative effects of opium, the experience of Mr. M'Rae induces the following report:—Speaking of the prevalence of Cholera, "it is a disorder that has become perfectly familiar to me from so long residence here, as well as from the great experience I had of it, while marching to the coast with Col. Cockerell's detachment in 1790; and when the vital powers were not too far exhausted before the medicine was administered, I invariably found opium, either in the liquid or solid form, given freely, a certain remedy, for the cure of it."

A proof of the efficacy of the sedative effects of laudanum, in this disease, is in the recommendation of this medicine by the Medical Board, to the magistrate of Balasore, who it appears was without medical aid. "The Board suggests, that laudanum is the remedy on which most confidence is to be placed, and if given at an early period of the disease, will generally succeed: a teaspoonful mixed with a little water, may generally be given for the first dose, and twenty drops may be given every ten minutes afterwards, until its effects are visible."

The result is thus described by the Hon'ble Mr. Melville: "These medicines were administered as far as circumstances permitted, conformably to the instructions of the Medical Board; the treatment prescribed by whom had indeed previously been adhered to in substance, I am happy to say, with great success. I did not employ native doctors from a want of confidence in their zeal; in the integrity of their practice in European medicine; and in their discernment and judgment in diseases. The means of cure are so simple in almost all cases, and nicety of practice seems so little required, that the medicines were placed in the hand of several intelligent natives, with directions to furnish them to any applicant for themselves or their friends, cautioning them only to proportion the dose to the age of the patient, and to repeat it

if necessary. It may seem somewhat paradoxical to prefer persons without any pretensions to skill on such occasion; but the deaths among those who received the medicine in time did not, I think, exceed four in a hundred."

In corroboration, Mr. John Patterson reports,—"I learn that Cholera some few weeks ago attacked great numbers in the town of Balasore, many of whom had died, until the magistrate, by the timely administration of tincture of opium, stopped its ravages, reducing the mortality, which averaged about twelve daily, to between one or two: out of 127 patients, to whom this medicine was given, only eight died."

Mr. Superintending Surgeon A. Ogilvie observes: "I am sorry to be obliged to report to you for the information of the Medical Board, that the Cholera has prevailed in camp during this month; but, according to the number seized, few, comparatively speaking, have died of the disease. I beg leave to submit to the Board a letter from Mr. Assistant Surgeon Lawson, 1st Battalion 5th Regiment N. I. Delhi, which gives an account of the disease, and shews the good effects of the early bleeding. The same plan has been followed in camp with the best effect. The following is an abstract from Mr. Lawson's letter.

'Bleeding seems to me to be the most essential point in the treatment of this complaint, but can only be used effectually early in the disease. All the patients from whom 24 ounces of blood could be got, readily recovered. I saw only one case, in which only 20 ounces of blood could be got with much difficulty, and very slowly from several veins, by means of the tepid bath, friction, with stimulating liniment, and which proved fatal in the course of a few hours. In some case the veins collapse and no blood can be obtained, in 20 or 30 minutes after the attack; in others a sufficient quantity may be got in 2 or 3 hours. *Some cases that are apparently slight at first, from the absence or slightness of the vomiting, become speedily fatal; while others, under the same treatment, in which the vomiting and purging are long continued and violent recover quickly**. I have seen death produced in stout healthy young men in about 5 hours, and in one child in 20 minutes.

* I have put this remark in Italics for the information of Dr. Kennedy, as they would in some measure support his opinion.

Calomel has succeeded in allaying the irritation of the system and stomach, where laudanum has failed; both were administered in large doses. Purgatives seem always necessary to excite the flow of bile, and sometimes require to be repeated for several days before there is the slightest tinge of bile in the stools. The tepid bath, frictions with hot cloths, and the application of a strong tincture of the country cantharides over the epigastric region (so as to produce a blister in 15 or 20 minutes) are certainly frequently useful; but in general, where from 24 or 30 ounces of blood can be got, in the beginning of the disease, quickly, little more is necessary except a large dose of calomel and laudanum, or afterwards a cathartic or two*.' "

Mr. Mellis communicates the following as his treatment: "I prepared a large quantity of the following medicine for distribution: of tinct. opium, 15 parts, diluted sulphuric acid 5 ditto, oil of peppermint, one ditto, mix; of this from 20 to 50 drops or more were given every twenty minutes till the vomiting ceased. The purgative employed was in the form of pills, each containing of aloes four grains, calomel two ditto, oil of peppermint, half a drop; of these one, two, or three generally proved sufficient to clear out the bowels and remove any sense of oppression, heat, or pain. Having met with several cases of relapse, among the convicts and others, I have, in most cases where practicable, and where there have been the least symptoms of inflammatory affection of the right hypochondrium, ordered small quantities of mercurial ointment to be rubbed into the extremities. By so doing, I have invariably succeeded in cases where, it was more than probable, had I not done so, I should have failed†." Mr. M. then communicates a case treated on the above system, but having added thereto some spices and a little gin, some hours after the first dose, and on the following day directed a drachm of gin to be given every half hour or oftener, the man died.

In another report Dr. Mellis thus exhibits the character of his dissections: "In a few cases, there were symptoms of considerable inflammatory affection of the liver; and in one case, where

* This is precisely my opinion.

† This is corroborative of Mr. Tytler's opinion of the use of mercurial friction.

dissection took place after death, I found that organ a great deal enlarged and inflamed."

Of the effects of laudanum in divided doses Mr. Gardner reports: "For this last month the natives of the district have suffered severely under Cholera Morbus. I have saved the lives of about five hundred by the exhibition of 30 drops of laudanum, and 5 or 6 of peppermint, repeated in diminished doses, until the spasm is relieved, when generally a gentle purge is necessary."

The following is an extract from Mr. Savage's report, stating the sedative effects of large doses of calomel and laudanum. He observes, that "20 grains of calomel with 80 drops of laudanum in a very small quantity of liquid, I generally found, check the vomiting, and enable the stomach to retain fluids."

Among the public documents, the following return of successful treatment is from Mr. Todd: admitted 1081, cured 1009, died 72. Unhappily there is no regular report of doses; but they were treated by sedatives as the following extract of that gentleman's letter testifies. Speaking of the medicines, he says, "the following has wholly been used in the late prevalent disease Cholera Morbus, such as opium, laudanum, calomel, and magnes. with ol. menth. pep. and aqua ammon." The following remarks are attached to his returns. "The disease made its appearance in August, and before the liberal intentions of Government were known, I had expended 12 quart bottles of laudanum." Whence I conclude Mr. T. depended principally upon this sedative to allay irritability.

The following is an extract of a letter from the Secretary of Government, bearing honourable testimony of the sense the Government had of Mr. T.'s zeal and abilities. "The Vice-President and council have noticed with great satisfaction the zealous and humane attention manifested by Mr. Todd, the surgeon attached to your station, in the relief of persons attacked with the Cholera Morbus in the city of Dacca and its vicinity, as well as the great success with which his exertions have been attended."

The following is an extract from the letter of Mr. Hamilton, the superintending Surgeon of the Benares division, communicating the result of the practice of medical gentlemen within circle of his superintendence.

"I was favoured with the receipt of a circular letter from the Adjutant General's Office, respecting the treatment of the late Epidemic. The treatment recommended does not appear to differ much from what was practised here; only that we made less use of calomel and purgatives; and I fear the calomel, without the laudanum, would have been of little advantage; in some cases a single dose of laudanum and oil of peppermint was sufficient, in others it was necessary to repeat the dose two or three times, or even oftener. To some calomel and purgatives were afterwards given; but often the recovery was so quick that they were not required."

Mr. Young reports, with regard to the cure: "After trying every probable and almost every proposed cure, I have been obliged to recur to nearly what I first set out with, viz. opium, æther, and other stimulants* in the first instance, followed up by repeated and unusually large doses of calomel. In many cases of Europeans, I have found good ale a most valuable remedy, when all others have failed in checking the primary symptoms." Mr. Young's practice was almost exclusively among natives about Calcutta, to whom, it appears, he gave laudanum, æther, and large doses of calomel. Of his success, Mr. Y. observes: "I beg to refer to the annexed memorandum for the detail of the number of sick. The number of cases amounted to eleven thousand two hundred and eighty, as per weekly report sent by me to the Medical Board, and the number cured was ten thousand and three hundred: twenty-five were left in a state of convalescence."

Mr. Muston, the Apothecary General on the Bengal Establishment, was himself attacked by the Cholera. The feelings of a medical man in this situation, who is so well able to judge of the symptoms, must be deemed important to know, and the best guide in the treatment, especially in the case of Mr. Muston, whose professional acquirements and experience are acknowledged. The following is his own description of the method he successfully adopted, which he has obligingly permitted me to copy from some printed but unpublished correspondence. "I took five grains of calomel, and two hours afterwards ol. ricini ʒ iss. and washed

* Did Mr. Young consider large doses of laudanum to act as a stimulant?

out with neutral salts. The pain about the navel continuing, two grains of calomel every two hours, and half a grain of opium every four hours. At night the pain was a burning heat, and I took pulv. jalap. ʒ ss. pulv. chryst. tart. ℈ ii. with mint water: it staid easy on the stomach three quarters of an hour; I was then sick and dreadfully faint, and took half a pint of water as hot as I could drink it. This gave relief for a time, when the same sensations returned; purging and vomiting relieved me. Took calomel, gr. iv. opii gr. ss. slept, and was better, but the pain at the navel the same. Took this morning, 7 A. M., calomel gr. ii. opii gr. ss. ; at 9, ol. ricini ss.: this operated but little, and I went on with calomel as before. At 1 o'clock P. M. the burning heat and uneasiness increased: took resin of jalap, soap, and calomel."

Such is the result of the treatment of this destructive pestilence by sedatives in Bengal. I now proceed to examine the Reports of gentlemen on the Madras Establishment, who have prescribed the same remedies.

SECTION II.

MADRAS REPORTS.

Mr. Smith reports: "Taking Mr. Corbyn's praetiee for my guide at the origin of the disease, I administered opium and calomel aeeording to his directions." It appears that Mr. Smith afterwards, to support the flagging eireulation, tried brandy, æther, and aleohol; but of their effeets he remarks: "I eould never suspend the vomiting, or produce any permanent benefit; opium appears the grand speeifie, and from its immediate action, I always preferred the tineture. That opium and depletion should sometimes be employed with equal sueeess in the same disease appears perfectly enigmatical; but the effect of both apparently is to relieve the internal congestion. Blood-letting effeetuates it direetly by abstraeting from the eireulating mass. Deeisive marks of inflammation have in some eases appeared in all the organs of life. Calomel was always employed, though relinquished by some surgeons on discovering that the vomiting and purging eould be combated by the opium alone, with as mueh effeet as when combined with ealomel. I however eontinued the ealomel from principle, on observing that a total absence of bile was one of the eharacteristics of the disease."

Mr. Sutton reports: "From the general success whieh was stated to have attended the praetiee reeommended by Mr. Corbyn of the Bengal Medical establishment, this was the first whieh I adopted, and although it was occasionally varied, I found myself obliged to revert to it as being the best." In a second eommunieation, Mr. Sutton reports. "The treatment whieh had been adopted by the native doetors, and recommended by the colleetor, was the administration of ealomel in doses of 15 grains, with large doses of laudanum from 80 to 120 drops. This I found had been their praetice previous to my arrival at Guntoor, and from the returns it would appear to have been attended with great sucecss; for the casualties in that town, and its immediate neighbourhood,

are certainly few compared to other parts of the zillah." The following are the admissions, deaths, and recoveries: admitted 5,417, died 1,336, recovered 4,081, which is scarcely 4 per cent. In a third communication, Mr. Sutton reports, that he noticed in many cases brought to the hospital, at Nellore, great determination of blood to the head, and that the spasms were unusually severe. The latter symptom commonly subsided two hours before death, and it was generally observed, that the purging also ceased about the same time. Wherever blood could be abstracted, this was attempted, and blisters applied to the scalp and neck.

Doctor P. Scott reports: "I have no hesitation in saying, from personal experience, that opium alone, early and judiciously administered, is adequate, in most instances, to effect a cure; and that it is in my opinion, very seldom necessary, when application is made early, to employ any other remedies, excepting it may be the warm bath, and perhaps frictions to the abdomen." Speaking of stimulants, Doctor Scott observes, that they require "to be administered in moderate quantity, and with some judgment and discrimination; they may be pushed too far in some cases; and I think I have seen the *free use of brandy do harm by occasioning great heat and irritation in the bowels, with fever and a tendency to inflammation.*" In a second communication, Dr. Scott remarks, "*spirits and other stimulants should be avoided. I think in the early stage they were obviously incompatible with the other remedies, and too often, I fear, counteracted the sedative effects of opium, and increased the morbid sensibility of the stomach and bowels.*"

Sir T. Sevestre says: "I am now to report upon a case that I regard as a sort of index in the event of a recurrence of the Cholera Spasmodica. This was the only instance that afforded me the satisfaction of examining after death; and which I did with the assistance of Mr. Conwell, when we found *the intestines had been in the hightest state of inflammation, not exempt from mortification, and even sphacelus. It was this solitary case of dissection that induced me to use the lancet in a subsequent patient,* that applied for relief on the 11th of this month; and singular or parodoxical as it may appear in the relation, *it is not the less a matter of fact,* that Allima, the living instance above

alluded to, was cured by me of the spasmodic Cholera, in the middle of October, with the prescribed remedies as adopted for general use; thus does it appear, that this young woman sustained two attacks of the same disease, at two distinct periods of her life, and that the last time she was cured *with bleeding, blisters, &c. under the strict antiphlogistic* plan.—*The spasms, which are concomitant with enteritis, if this was her complaint, were removed by opium and the warm bath*, while the inflammation (as I have before said) was diminished by the operation of calomel and the external application of cantharides. I do not mean to say, that inflammation is an invariable attendant on this Epidemic, and *yet it is hardly consistent with reason to imagine the existence of strong spasms in the bowels, without some slight inflammation resulting either in their exterior coat or in their mucous membranes.* If I were permitted to act discretionally, in the event of a second visitation of the Epidemic, I should *use the lancet in very many instances, owing to the immediate relief that Allima experienced by it, independent of the glaring state of inflammation exhibited in the subject dissected;* at the same time, my subsequent treatment should be guided according to the degree of spasm, pyrexiæ, or other urgent symptoms. *Calomel in large doses has certainly produced excellent effects, and may with safety be given, whether the case is inflammatory or spasmodic.*"

Mr. Kellie reports: "The mode of treatment, on which the greatest reliance has been placed, and adopted here with some success, is that recommended by Mr. Corbyn; but to insure that success, the remedies must be exhibited at the very commencement of the attack, and other auxiliarics will often, with great benefit, be called in. When the pulse can bear it, venesection at the commencement would be employed; with Europeans, particularly, I have no doubt with the greatest benefit. Such is the individual treatment that has been found most effectual, and where it is carefully followed, about 9 out of 10 will recover by it."

Mr. Superintending Surgeon Peyton reports: "The symptoms in general were such as described by Mr. Corbyn. The spasms in the natives were scarcely observed; although they complained much of them. Mr. Corbyn's plan of treatment was chiefly

found to be successful, when the patients reported themselves in time, that is, within 5 or 6 hours; after which period the pulse is not to be found at the wrist, the extremities become cold, and the prostration of strength is complete, and death ensues very soon. Several bodies were carefully inspected; but the only unusual appearance was slight inflammation, and determination of blood to the stomach, intestinal canal, and the other abdominal viscera, and even to the brain itself."

Dr. Campbell reports, he "attempted, as the chief indications of cure, to restore the balance of circulation by relieving the heart and large blood vessels from the load which oppressed them, in consequence of the repulsion of blood from the surface, and to remove the visceral inflammation and the spasms caused by internal accumulation. These indications were answered by blood-letting, medicines to determine to the skin and internal canal, and frictions to excite the torpid vessels of the surface; blisters, wherever any local affection seemed most prominent. In *no case* has the venesection ever disappointed our expectations. We have found the appearances on the dissection of twelve bodies invariably the same, differing only in degree, viz; congestion in the large vessels of the abdomen, thorax, and head; *spots of inflammation* on the stomach, intestines, and omentum; the vessels of the mesentery and omentum appearing in some cases *as if they had been injected; frequently slight adhesions of the intestinal folds to each other and to the peritoneum, the lungs inflamed and adhering to the pleura.* In all the bodies *the inner surface of the pericardium was found inflamed*, and the coronary vessels extremely turgid." From these appearances he perceived the propriety of abandoning the stimulants, and the necessity of blood-letting as the best means of restoring the balance of circulation and obviating the inflammation.

The two following cases are specimens of the treatment. "In the first of these, twenty grains of calomel with eighty drops of tincture of opium, and fifteen of peppermint were given, but rejected as soon as swallowed; venesection was immediately had recourse to; and while the blood was flowing, his belly and limbs were rubbed with bags containing hot salt; when about *forty* ounces had been abstracted, *the spasms and oppression at the*

præcordia subsided, the pulse rose sensibly under the finger, and he expressed himself as feeling easy; another dose of calomel and laudanum was then given and retained. He was covered up, and had weak warm negus and ginger-tea to drink; he continued restless for a short time; but at length lay perfectly quiet; breathed easily and perspired freely; eight hours after this, a strong dose of jalap and a purgative enema were exhibited: he recovered." The second case is thus detailed. "He was immediately bled, and the blood allowed to flow, until the pain in the epigastrium and the dyspnœ subsided, and the pulse at the wrist could be felt distinctly. A dose of calomel and tincture of opium was then exhibited, and a large blister applied to the surface of the abdomen; he was covered up, allowed to drink warm ginger-tea in small quantities; he lay quiet for some time, but the restlessness again recurring after the lapse of about three hours, the calomel and laudanum were repeated; he slept for some time, and on awaking took a large dose of ol. ricini."

The following is Dr. Campbell's description of his unsuccessful case: "calomel and laudanum, as recommended by Mr. Corbyn, the hot bath frictions, *stimulants*, both internally and externally, were all employed as directed; but without success, and he died." I need not remark that stimulants formed no part of my plan, and that had Dr. C. adopted, in the first instance, the treatment I recommended, he would according to all human probability have met with complete success.

The following case is from Mr. Christy's report: "The patient took an emetic, then a pill containing one grain of camphor, one of ipecacuanha, and one of calomel. This was repeated every hour; after this 15 grains of calomel, 50 drops of laudanum, and 10 of oil of peppermint; hot brandy and water was given with a view of supporting the strength; the patient died. On dissection, the peritoneum shewed strong marks of inflammation, the internal coats of the stomach, intestines, and biliary ducts, presented a white corrugated appearance, and were much *thickened*, without marks of internal inflammation; but when opened *the strongest appearance was exhibited; distinct globules of blood appeared in the ramifications of vessels which in a healthy state contain a colourless fluid;* the stomach contained a little water.

"From the above appearance," says Mr. Christy, "as also from conviction, that in cases of visceral inflammation, the pulse gets fuller and softer by bleeding, and also knowing that visceral inflammation is liable to terminate in gangrene in three hours, when the symptoms are violent; these considerations induced me to try the effect of bleeding. Unfortunately the four first cases were not brought to the hospital in time, to try the experiment, although repeated orders had been given by the commanding officer and adjutant. Since that time, when a man is admitted, I immediately take from 12 to 30 ounces of blood from his arm, *which has not as yet failed* in allaying the irritability of the stomach; 15 or 20 grains of calomel, 50 drops of laudanum, and 10 of ol. menth. pip. were then given. If there was spasm or pain above the abdomen it was rubbed over with ol. terebin. and pulvis lyttæ in the same proportion as is commonly used for blistering horses; and at the same time the extremities rubbed with warm cumlies, and frequent draughts of warm diluent liquids given; and the after treatment was merely mild purgatives or simple injections, according to symptoms, *as none who were brought to the hospital in time to admit of this treatment, have yet died.* I have generally adopted it."

Mr. Wilson remarks as follows: "The rapidity with which this disease runs its course, terminating fatally, in some instances, in five or six hours, gives no room for delay in its treatment, in which I was guided by the account of the mode used by Mr. Corbyn, and published by that gentleman. The success which had attended it in his hands, and the circumstance of the few cases which had occurred in this place about a month and a half before, amounting to nineteen or twenty, having all of them readily yielded to it, gave me great confidence in it; and in the manner alluded to, with the addition of the use of the hot bath, were all my patients at first treated."

It appears after this, that Mr. Wilson's patients were brought to him in a state of stupor, and that he found he was not so successful; he was induced, therefore, besides external frictions, to use stimulants internally, among which, however, we do not observe *brandy or arrack.* As a stimulant internally,

I gave (having no other to administer*) *six grains of camphor* suspended in warmish water, somctimes with, at others without oil of peppermint, every quarter of an hour; until the circulation was in some degree restored to the extremities, and heat to the surface; and then gradually diminished the dose, and lengthened the intervals at which it was taken, till it could with safety be discontinued." The result of this treatment is as follows: admitted 195; died 25; recovered 170. It appears, that Mr. Wilson would have been still more successful, but from the character of the men who became his patients.

"From this statement," he adds, "it will appear, that the number of deaths has been much greater than I had led myself to expect, but it may be remarked that the disease seems to occur with very different degrees of virulence, in different places, and even at different times in the same place; for example, the disease, which had been in this camp, a few weeks before, was certainly much milder than it was when it made its appearance the second time; and it yielded readily to the treatment used by Mr. Corbyn. In its last attack it varied considerably in violence at different times; almost every man who was taken ill on the 19th and 20th of July died.

"I may also state, as a cause of my not having been so successful as I wished and hoped to be, that in all cases in Bajee Rao's camp, and among our own and Col. Skinner's followers, the disease *was considerably advanced before assistance was asked, and the patients when brought to the hospital, were generally left without any one to pay particular attention to them, with a disease which requires a particular attendant with almost each individual.* I found it next to impossible to prevent their drinking cold water; the rains were at their height; and if the patient could not procure cold water otherwise, they drank it from the pools, which stood near the tent. It was also impossible for me to be as much with the sick as might have been desirable."

He further observes: "The practice of bleeding freely both in Europeans and natives, was latterly followed with great success by Messrs. Bellet, of the 3rd Light Cavalry, and Boyd, of the

* A very fortunate circumstance.

2nd Battalion 6th Native Infantry, in every case, in which it was practicable, and there is so much of reason in the practice that *I think it ought in no case to be neglected.* The appearances on dessection *certainly shew much inflammation in the viscera*, but I cannot, from what I have seen of this disease, believe it to be one essentially inflammatory, or that death is in all cases the consequence of the degree to which that may have run. I never saw from gastritis or enteritis so sudden a loss of circulation and vital heat; nor do I believe that any degree of inflammation, short of its actual termination in gangrene, could produce the state in which an hour or less of this disease throws the patient."

It is unquestionably true, that inflammation is not the exciting cause, but it is the proximate. Mr. Wilson's remark, that on dissection much inflammation was exhibited, tends to prove, that the indication of treatment, in consequence of this effect and tendency to it, is the reverse of employing internal stimulants, inasmuch as these, if the disease itself should not produce inflammation, sufficient to terminate in sphacelus, do certainly promote it.

Mr. Boyd reports: "Looking on the disease as in some way connected with a want of action in the hepatic system, and an overcharge of blood in the internal circulation, from its being repelled from the surface on the internal organs, (owing to something perhaps peculiar in the atmosphere,) and from the known sympathy that exists between the liver, brain, stomach, and skin, it may, in some manner, account for the antecedent and subsequent symptoms; from this view of the disease, I considered it of an inflammatory spasmodic nature, and bleeding being the best, or rather, chief remedy in such complaints, as at once lessening spasmodic action, allaying gastric irritability, relieving the heart and circulating system, and warding off inflammation and its bad consequences, especially, when the disease was in its incipient stage, I therefore resolved upon giving vencsection a full trial, and repeating it as often as the spasms or cramps recurred, or until the irritation of the stomach was appeased. At the same time, a large blister was applied over the region of the stomach and bowels, and after the patient had recovered a little from the bleeding, as it was always *usque ad deliquium*, ten or fiftcen grains of calomel were given,

mixed up in a little congee, and washed down with a draught of the camphorated mixture, by which means I seldom had occasion to repeat the dose, as the previous bleeding seemed to prepare the stomach for its relief, and aid its operation by emulging the biliary ducts, and determining to the bowels, and restoring them their balsamic bile, as in most instances there appeared a total want or suppression of that article.

In six or seven hours after the calomel was administered, a laxative draught, composed of an infusion of senna and salts, or oil, was given to determine to the bowels, and accelerate the operation of the calomel. The compound powder of jalap would have been preferred, but I had none in store. My expectation of success, after adopting this line of practice, was more than fulfilled; as out of twenty-eight admitted and treated in this way, I only lost two, and both were very unfavourable cases on admission, *from their not applying until the disease was far advanced, and pulse imperceptible. I attributed unfavourable results to too free and early a use of cordials and stimulants; and in no case where they were not given, have I had occasion to repent it, as I have seen many more recover, of whom I could entertain very little or no hopes, without than with the free and repeated use of cordials and stimulants;* and even in those cases, where extreme looseness, approaching to death, took place, I ascribe more success to external stimulants, frictions, and glysters, frequently repeated, than to the other plan, and I trusted entirely *to diluents given internally, such as congee, &c.*

Of the sedative effects of large doses of calomel and laudanum, Mr. Boyd observes: "The first patients admitted were treated agreeably to the plan laid down in Mr. Corbyn's letter, of the Bengal establishment, with calomel and tinct. opii, repeated as symptoms indicated; the first dose was in many cases rejected*, but the second seldom failed to sit on the stomach, *and allay the inordinate gastric irritability and lessen the purging; but it proved such a powerful sedative in most cases, that the patient soon after swallowing the portion fell into a comatose state.*" This is what I desired, vide my letter, with the exception that what Mr. Boyd designates as "comatose," I believe to be natural sleep.

* This may be anticipated; before the medicine reaches the stomach, when violent vomiting is going on, it is rejected.

Mr. Millar reports, that "Every thing seems here to depend upon *the ready use of medicine; and perhaps no disease is so easily overcome when taken at the onset; but the very reverse is the case when neglected*, even for a few hours. The patients, when admitted, took twenty grains of calomel and two hundred drops of laudanum, were well fomented, and bled till faint. When the disease had made but little progress, the patient under this treatment generally fell into a sound sleep, and awoke free from all complaints; but when the disease had been of longer standing, the stomach often rejected the medicine, which was repeated again and again; but without procuring sleep. *Blood-letting had the most commanding influence* over the spasms, and when the disease was taken at an early period, was almost always effectual; but when the disease had gone on *for six or eight hours*, and the skin had become purple, little blood could be obtained." Mr. Millar's cases were, of Europeans admitted 166, died 37; admitted of natives 33, died 13.

Mr. Trotter observes: "So great a repugnance had the natives to bleeding, that it was a considerable time before I could prevail upon them to adopt it, and not until several fatal cases had happened. The first man on whom it was tried was looked upon by his friends as being completely out of the reach of medicine; they were, therefore, highly surprised at the good effect of it, especially when out of the *next ten* that were bled, *not a case* terminated fatally."

The following are Mr. Duncan's remarks on the efficacy of bleeding: "We were of opinion, that bleeding was the only probable remedy to be employed in this disease, by relieving the internal parts from the great congestion of blood, and subsequent spasms. On the 21st and 23rd, two men of the 84th were admitted into the hospital with spasmodic Cholera, well marked, and severe. Both these men were bled freely on their first arrival in hospital, which greatly relieved the spasms, the pulse becoming soft and regular after bleeding."

Mr. Owen reports: "The appearances, on dissection, have been so uniform in their tendency to prove the great necessity of relieving the circulating system, and preventing that congestion which has been in every case so apparent, that blood-letting

became with me a primary object of attention. I have, therefore, used the lancet with some degree of freedom, and where the disease would admit of a sufficient quantity of blood being abstracted, I have found it of the most essential service in relieving spasms and the irritability of the stomach. But how far it can be used with safety in weak and debilitated constitutions, and old age, still remains doubtful; yet in these even, if taken with caution, and sufficient quantity in the first instance, it will be found a valuable auxiliary. I have taken ℥ xx. of blood from the arm of a delicate native woman, with the happiest effect, where the spasms were very violent; nothing more being required afterwards, than a dose of calomel and rhubarb to open the bowels. You will observe in the case of Matross Tate, that ℥ xl. of blood were taken before the spasms abated; and though they afterwards returned with considerable violence, yet his pulse immediately rose and became soft and full, and the heat returned to the surface. This, I am confident, could not have taken place, had not the circulating system been relieved in the first instance; nor do I think the same effect would have been produced, if this quantity of blood had been taken at two or three times. *I am happy to say, that I have not lost one patient, who has been bled, or at least, when the blood would flow in a moderate degree, so as to relieve the most urgent symptoms.*"

Mr. M'Laine reports: "I am satisfied, that calomel and opium should not entirely be trusted to with Europeans. When blood-letting is had recourse to, it should be largely, considering at the same time the patient's constitution and habits. I found it necessary to go to the extent of ℥ xxviii. at once (vide Lukeland's case); and even after this, the pulse continued full, but became softer with an immediate abatement of the spasms, which never recurred: the pulse frequently leaves the wrist at every attack of spasm, and it is evident, if that most dreadful symptom of the disease is not early arrested, it must very soon extinguish the vital powers, by forming congestion in the internal organs, and most particularly the lungs." Speaking of the natives, Mr. M'Laine remarks, "I have had several cases of Cholera amongst the natives attached to the regiment *with whom the calomel and opium invariably* succeeded."

Mr. Bucke remarks : " In the first case, I began with large doses of calomel and laudanum, with a small quantity of congee, to abate the incessant thirst, strictly forbidding the use of cold water ; but finding the vomiting not subdued by this method, and apparently increased by the warm fluid, whilst cold liquid produced spasms and griping pains, I changed my plan, as I found the disease quickly advancing to its fatal termination, and directed opium, made into a very soft paste, (to insure its speedy operation on the coats of the stomach,) to be given with the calomel, and instead of warm congee, an infusion of cinnamon and cloves nearly cold, which proved an agreeable stomachic. But the thirst continuing so incessant, I allowed a spoonful of congee barely warm, and occasionally a little of the infusion to be given at a time, as I found if more was taken, it rarely failed to produce vomiting. At the same time, fomentations, as hot as could be borne, were strenuously applied to the seat of the spasm.

" Finding, under this plan, I generally at once subdued the vomiting, my next object was to change the watery evacution for healthy stools ; and for this purpose I employed various purgatives, but finding salts and the compound powder of jalap seldom remain upon the stomach, I had recourse to the ext. colocynth. or the croton pill, both of which answered the purpose, and evacuated the bowels of their highly offensive, dark-coloured contents. After a few copious alvine discharges had been procured, the amendment was striking, the pulse rose, the natural heat gradually returned, and the patient was roused from his former listless state to a sense of returning health and strength.

" When the first dose of the medicine was rejected, (as was not frequently the case,) I waited a little, consulted the inclination of the patient as to what he would like to take, of which I generally gave him a little ; as the stomach retained this, I repeated the opium ; and the vomiting ceasing, the calomel was administered. As I found the stomach so extremely irritable and the only organ through which I could administer to the disease, I thought it advisable to humour its inclinations, and allow the patient to take, in minute quantities, the article he seemed to like, convinced, that if the stomach could retain what it fancied, it would not nauseate medicine forced upon it. I was careful, however, not to

lose too much time in my attempts of this kind, in a disease which experience had taught would be quickly fatal. By degrees, as the state of the stomach allowed, I increased the quantity of congee to assist the purgatives, which were frequently slow in their operation, carefully avoiding any distension of stomach. Although I considered checking the vomiting as the first and most essential object, I yet found my patient not materially improved till the purgative had taken its full effect. In the fatal cases, the bowels were obstinately costive, except the watery evacuations mentioned as a symptom of the disease, and I lost no one whose bowels were freely evacuated. In some, the desire for cold water was so irresistible, that a few took it by stealth, in very large quantities; this never failed to add to their suffering; the vomiting was reproduced, and the force with which it was thrown off exceeded any power I imagined the stomach to possess." The result of this gentleman's treatment was, admitted 209; died 22.

From Mr. Connell's report we learn, that "the most effectual treatment with the Europeans was immediate and copious blood-letting, giving besides the other remedies, calomel and laudanum."

Mr. Train reports: "The practice I have followed has been bleeding in every case, when blood could be procured; and here, I may observe, that when this is the case, most patients recover. In general, on opening a vein the blood flows only in drops, nor can even the most violent stimulants affect the circulation sufficiently to produce a flow from the veins of the arm."

Mr. Currie remarks: "The two first cases of my journal are transmitted to show the advantage of bleeding, in removing or mitigating spasm. Mr. Smith Young, at Aurungabad, is enthusiastic in his recommendation of venesection; having bled one man with famine and pestilence in his looks, and another who had attained his 76th year."

Mr. M'Lean has the following observations in his report: "My first attention was directed to restoring the stomach and bowels to their usual healthy action, and removing the spasms; for this purpose, from 15 to 20 grains of calomel were administered, and washed down with tinct. opii from 60 to 100 drops, (according to the urgency of the symptoms,) ol. menth. pip. 15 to 20 drops, and camphor mixture ℥ ij. to be repeated as often

as the stomach rejects it, without the oil of peppermint, which in many cases seemed to add to the distressing sensation of burning heat at the pit of the stomach*. This, in many instances, put a stop to the spasms and vomiting in a few hours. In more severe cases, blistering and frictions with the grounds of the anti-spasmodic tincture over the stomach, were attended with the most decided benefit, in putting a stop to the cramp and vomiting. The propriety of bleeding was strongly impressed on my mind from observing the turgid state of the vessels of the several viscera of the thorax and abdomen as demonstrated by dissections, together with the advice contained in the Medical Board's circular to Superintending Surgeons. Of fifty-six cases of Spasmodic Cholera, who were bled to fainting, only one died. Small bleedings are prejudicial, inducing debility without relieving the system, and I am induced to say as my opinion, that a second bleeding does no good, if protracted beyond 6 or 8 hours after the first; we should, therefore, *bleed largely or not at all.*†"

On the use of stimulants, this gentleman remarks: "I have used brandy alone, and mixed with warm water and spices, and also æther: but I cannot say that I ever saw much benefit from their use."

Mr. Cother informs us, that by the use of fumigation and castor oil only, 278 recovered, out of 292; he does not appear to have used any stimulants. The only medicine he reports to have used, besides the fumigation and castor oil, were calomel and laudanum.

Mr. Neilson reports: "In several cases of the Epidemic, the laudanum only was employed to arrest its progress, and the calomel was entirely laid aside, till the attack had subsided. A dose of calomel and jalap was afterwards exhibited as a purgative. This plan appeared to answer better than giving a large dose of calomel at the commencement of the attack; for I have often suspected that it produced irritation of the stomach‡ and vomiting,

* If such apprehension was excited from so small a dose of oil of peppermint, what must this gentleman have thought of the use of ardent spirits!

† This is most excellent advice.

‡ How such an effect could be suspected, I cannot conceive, when the leading symptom of the disease is irritability of the stomach! How easily is a symptom of disease mistaken for the effect of medicine.

which would not otherwise have happened, although the laudanum was exhibited immediately after it" Thirty-four patients of Mr. N.'s were admitted, out of which number 10 died. It is to be lamented, that this gentleman so misunderstood the sedative powers of a large dose of calomel, and did not use it on the first attack.

Mr. Chalmers states in his report, that his treatment was first, to bleed, if possible, and freely; 2nd, to give a scruple or 25 grains of calomel, washed down with 60 drops of laudanum, prepared with camphor and ol. menth. pip.; 3rd, should this be rejected, a dose of æth. sulphuric.; 4th, and again, the calomel and laudanum, if necessary; 5th, the stomach is rubbed with a tincture composed of cantharides, garlic, and other acrid acids; 6th, heated sand or ashes, in a soft cloth, applied gently to the extremities and surface in general; 7th, anodyne glysters, if indicated; 8th, so soon as the patient awakes from his first nap, a small purge of jalap, or aloes; 9th, if the spasms are severe, a camphor and opium pill every one or two hours.

Mr. England reports as follows: "I have chosen, for my return, three distinct columns for the different stages of the disease, which digression I hope you will excuse. The first stage or primary symptoms, evidently denote a derangement and impaired action of some part of the alimentary canal, which is usually relieved in the period of an hour or two, by opiates and a calomel purge. In the second stage, I embrace the following symptoms: frequent or incessant vomiting and purging of a watery or wheyish fluid, hurried respiration, anxiety of mind, pain and burning sensation over the larger curvature of the stomach, extending often to the umbilicus, frequent spasmodic contraction of the muscles of the extremities, accompanied with the most excruciating torture; skin usually cold and clammy, pulse extremely depressed and not preceptible at the wrist, pupils of the eyes often contracted, with a sensation of giddiness in the head, a perfect possession of the mental faculties; the eyeballs often somewhat depressed in their sockets, and occasional distortions of the muscles of the face. In the third stage, I comprehend the following symptoms: hippocratical countenance, total deprivation of heat and sensibility of the surface of the body, even on the application of the most

powerful caustics, cessation of vomiting, excepting when the chest leans forward, purging continues, and is involuntary, respiration scarcely preceptible, no spasms, excepting with few individuals, whose constitutions are usually robust, pupils of the eyes dilated, and the eyeballs depressed, no contraction of the pupils on exposure to a strong light, pulse imperceptible, and often also the action of the heart and respiratory muscles; sometimes hiccough intervenes, on the approach of death, which then generally ensues in thirty or forty minutes. In the last stage of this disease, I have found my practice quite unsuccessful; but in the second, much more fortunate, and in the first always so. I have made several trials of the vapour of sulphuric æther, since I last had the pleasure of communicating with you; and I believe it has assisted in quickening the circulating system; and conjoined with the practice pointed out by the Medical Board, I think that some reliance may be placed in it. When a re-action of the system has been obtained, and the vomiting and purging have still remained unabated, I have been induced to use frictions of large proportions of mercurial ointment, combined with a few grains of hyd. oxymur. and have used internally small and repeated doses of the latter medicine, conjoined with opiates. Whenever I have succeeded in promoting ptyalism, the patient became relieved and recovered."

Speaking of the case of Capt. P. who was brought to Mr. England, in a dying state, he remarks, that the countenance was much dejected, the eyes dim, pupil greatly dilated and insensible to the strongest light, indicating pressure on the brain, produced, as he imagines, from a loss of tone in the extreme vessels of that viscus, thereby retarding the natural progress of the circulation in that organ: most probably, he thinks, inflammation had existed previously in the brain, as the latter organ generally participates in disease with the stomach, as indeed with almost all the organs in inflammatory disorders. Hence we may conclude that Mr. England considered the effects of Cholera to be inflammation.

Mr. Surgeon Mather reports: "In all the more serious cases, 15 or 20 grains of calomel were put upon the tongue, and washed down with half a drachm of the tincture of opium, in ℥ ss. of warm congee. In case of these being rejected, they were sometimes

repeated, with the precaution of giving the tincture with congee slowly, or in two or three draughts at short intervals; but 80 drops of laudanum with 20 of essence of peppermint and ℥ ss. of brandy in congee, were more frequently given in preference.—The medicated hot vapour bath was frequently used; but on a trial of the vapour bath or steaming cot recommended, it appeared to possess such advantages in power and facility, with a small comparative degree of fatigue to the patient, that I have since chiefly made use of it. I have considered the successful termination of three cases, in which the pulse at the wrist could not be felt for many hours, and which seemed utterly hopeless, as indebted principally to the repeated use of this remedy. Bleeding was employed with success; in one case, in a very advanced stage of the disease. The patient, who was not more than 18 years of age, complained of giddiness, with a sense of weight in the head; he was restless, and breathed with difficulty; he had been twice in a steaming cot, but the pulse remained undistinguishable, and the skin continued cold. I succeeded in drawing about 12 ounces of blood from the arm; for no pulsation could be felt in any of the branches of the temporal artery, and I did not consider this a case, in which I could, with propriety open a jugular vein. The weight in the head was somewhat relieved by bleeding; the pulse was just perceptible; though still restless, sleep took place at short intervals; the natural heat was gradually restored, and at length uninterrupted repose succeeded. Liquid blister was occasionally applied to the epigastrium, but the hot-water blister appeared to be more powerful; and frictions of the body generally with a tincture of chillies and camphor, as well as fomentations, were used with advantage, to second the power of the bath in tending to restore the vital energy. Magnesia in the quantity of a drachm, was given for the sense of heat in the alimentary canal, with some advantage; but the effect appears to be increased by the addition of 50 drops of laudanum. Castor oil, with a portion of spirit and tincture of senna, rhubarb with tincture of jalap, and sometimes 6 or 8 grains of calomel, were found to answer well as purgatives." Mr. Mather's admissions were 317; died 28.

Mr. Wight reports: "The remedies employed consisted of anodynes, administered by the mouth, and in clysters; calomel in

various stages of the disease, and in doses varying according to the symptoms. Turpentine, as a cathartic, was administered in several cases. In some it was of great service, *and in others, the reverse.* Rubefacients were used with great freedom, and generally with advantage.

"The first patient who was bled was extremely emaciated and sickly. He had laboured under a quotidian about two months. The bleeding was followed up by calomel and opium, and frictions with camphorated mercurial ointment on the spine. Under this treatment both diseases were arrested.—In the present Epidemic, I used magnesia frequently, with great freedom, as an auxiliary. In those cases where thirst and burning heat of the stomach were permanent symptoms, *it gave great and immediate relief.* It was usually administered in the drink; a quantity of it was swallowed with every mouthful of the fluid." On dissecting, Mr. W. observed turgidity in the hemispheres of the brain; the veins enveloped by the arachnoid membrane, and pia mater very turgid; some of them containing dark, others red blood. The membranes were thickened, and the whole superior surface of the brain covered with small air bubbles, and some serous effusion. The base of the brain was covered with turgid vessels; the choroid plexus was so highly injected that it was perfectly black. The lungs were anteriorly of a livid colour; posteriorly, very dark from accumulation of blood. The small intestines exhibited a purplish blush; their small vessels being finely injected. Between the mucous and muscular coats of the small curvature of the stomach, a quantity of *coagulable lymph was effused*, indicating the commencement of organic disease; there was a dark-brown patch on the large curvature, produced by venous congestion.

Mr. Turnbull reports: "As the detachment consisted of stout young men, from the flank companies of the 20th, I found the happiest effects *from bleeding copiously, in the first instance, removing spasm and quieting the irritability of the stomach.*"

Mr. Donaldson also observes: "In every case of Cholera, when the patient applied in time, and the arterial action was sufficiently strong to admit of venesection, I took from 12 to 16 ounces of blood from the arm. It was invariably followed *by a mitigation*

of the symptoms, the spasms disappeared, and the subsequent alvine evacuations were generally bilious."

The following observations are from Mr. Chapman's report: "Although I have before spoken hesitatingly upon the nature of the morbid change induced in the cerebellum, the more I reflect upon the subject, the more strongly does it bear upon my mind, that it is inflammation. At first it appears to be impossible, that inflammation of any organ of such vital importance as the cerebellum could take place, without producing excitement of the circulation to a very great degree, such as certainly does not occur in the first, or indeed in any stage of the Cholera. I think, however, that the absence of this excitement, even on the supposition of its being inflammation of the cerebellum, is easily explained. The injury suddenly accruing to this organ is necessarily of that serious and extensive character, that I can most easily conceive those organs, the functions of which are directly dependant on the cerebellum, would, rather than be influenced by excitement, suffer a direct and immediate retardation in their operations. The intimate connection subsisting between the heart and cerebellum, through the medium of its nervous communication, directly accounts for the absence of excitement, upon the principle above-mentioned, viz. the severity of the injury sustained in the cerebellum, an organ immediately essential, and presiding over the functions of the circulation. To illustrate this circumstance by one example, we will suppose a fracture of the occiput, and consequent injury of the cerebellum. This would be a severe and sudden injury; but the effect is not excitement, but, on the contrary, a depression of circulation, which takes place immediately after the occurrence*. Such then do I conceive to be the nature of the injury inflicted by severe and rapid inflammation of the cerebellum, and am consequently of opinion, that *the absence of excitement does not constitute any objection to the supposition of its being inflammation of the cerebellum.*

"All the reports, which have hitherto been published upon the treatment of Cholera, exemplify very strongly, *the utility of bleeding in the earliest stage of the disease*; but it is also

* And surely here is sufficient evidence of the necessity of avoiding the use of stimulants.

observable, that this remedy has been had recourse to in all, even in its most opposite stages. In reading the Bombay Reports, (excellent as they are in illustrating the good effects of bleeding in the first stage,) especially does this become apparent; in the indiscriminate use of the practice, patients are bled both at a time when the pulse is scarcely operated on by the disease, and also in the latter stage of the malady, when, from the almost total absence of the circulation, blood scarcely can be drawn. The effect of bleeding, in the first instance, does, in almost every case, appear to be marked with a most decided beneficial result, and even where recovery has not been the consequence, a retardation of the last symptoms of the disease has certainly been obtained; but whilst on the one hand, in the first stage of Spasmodic Cholera, bleeding appears to be thus beneficial, it is no less evident that the use of the remedy in the *latter stage is almost uniformly attended with that result*, than which no other would be expected. The limited opportunity I have had, in comparison with many others, of putting the practice of bleeding into execution, certainly does not warrant in itself the above observation. It has however been the result of the little experience I have had; it is to be observed by the perusal of all the reports upon the subject, and is an inference fairly to be deduced from every analogy, which bears upon it.

"In the early stage of the disease, and whilst the pulse remains but little altered or diminished in its strength, *nothing certainly should forego the use of bleeding*. The extent to which it should be carried must necessarily depend on the effect it produces upon the system generally, and the circulation in particular; but that no delay should obtain, in its being put immediately into execution, must appear very clearly by the knowledge, that in a short time the pulse commences to sink, and the period has then passed when the only sufficient remedy might have been employed. I have here gone so far as to denominate bleeding the only efficient remedy. If I have not been borne out in this observation, certain it is that no other remedy can be said to be efficient."

Mr. Provan reports: "In the few cases treated at this place at this time, where the blood could be got to flow in a stream

and a sufficient quantity obtained, the *violence of the disease was subdued, and they all rceovered.* A peculiar case occurred in one of my servants, who had been much exposed at Nagracoil, had attended the sick, and was exposed to the rain on the road to this place. The attack was severe : 25 ounces of blood were taken from his arm in a full stream, and the usual dose of calomel and laudanum given ; he was soon afterwards reported fast asleep ; about two hours after this, the disease had returned with increased violence, and when I saw him, the pulse could barely be felt, occasionally vibrating ; veins were opened in both arms, the blood sometimes came in drops, sometimes entirely stopped, and by persevering in this way for above an hour, it came at last in a full stream, and about 16 ounces were taken. After a severe struggle, hc recovered, and is now only suffering from an acid blister."

Mr. Williams reports: " With respect to the treatment, my first attempt was always to procure blood from the arm, or temporal artery. If that succeeded, which it almost always *did in the first stage, the patient invariably recovered ;* the blood being at first ncarly of a black colour, of the consistence of oil, and becoming at last perfectly natural. After bleeding, I gave hyd. sub. ℈i. in powder, washing it down with a draught composed of tinct. opii gtt. 80 aquæ ℥ ss. M. The patient often slept or dozed for a short time after this, and in that case felt greatly relieved ; the stools became less frequent. In about 12 hours, if the pulse continued soft, the calomel was repeated without the opium ; if the pulse was hurried or small, with the opium ; in 5 or 6 hours, the calomel was given, depending on the pulse as mentioned before, whether with or without the opium. The stools, about this time, generally changed to a black colour, then green, afterwards mixed, and at last natural."

It appears, that the detachment with which Mr. W. was doing duty, consisted of 350 Europeans, one half old soldiers, from the King's Regiments ; the other half, for the most part, young men, lately arrived in the country ; and these were very undisciplined, which prevented Mr. Williams, from being so successful as he otherwise would have been, since most of his patients tried to cure themselves with spirits before they applied to him. He remarks, therefore, on the danger of delay : " If the men delayed coming for 2, or 3, or more hours, which they often did,

trying burnt arrack and other things in their own tents, the symptoms of course were more severe."

Dr. Fasken observes in his report: "The Sepoys had a great abhorrence to venesection, and it was with great reluctance that they submitted to the operation; but the first case, in which it was practised, chanced to recover, and he held it up to the rest as a *valuable remedy.* I have said in a former report, that Cholera exhibits the most complete example of venous congestion of any disease whatever; and on this principle all the symptoms may be explained. The suddenness of the attack and the circumstances under which it occurs; the rapid failure of the pulse, the corrugated state of the skin, and collapse of the features; all shew that the blood suddenly leaves the surface. The redness of the eyes, which is not inflammation, and the comatose state of the patient, shew, that the brain is engorged; the laborious respiration, that the heart and lungs are overloaded. Blood-letting would seem to be highly indicated; but the congestion takes place so rapidly and so extensively, that no blood will flow in any reasonable quantity, and what does come away, more resembles gore than natural blood. After the re-action is fairly established, *venesection is not unfrequently necessary to prevent inflammation**, and disorganization of the affected organ. In the accompanying case, it was tried several times, when the pulse was perceptible, but without effect; for the pulse was soon lost again after the arm was exposed. Absolute rest, in a recumbent position, seems to be a *sine qua non* in the case, together with as great a supply of warmth as possible, and by these means alone the pulse and circulation will sometimes return; but every attempt of patients to raise or expose themselves is followed by a repetition of the symptoms. Calomel and opium seem to be very useful in the first instance, and an active purgative, as soon as the stomach will retain it, has always been followed by copious stools and much relief."

Mr. Barton found emetics beneficial; he reports: "The tart. antimon. acted in a very few cases as an emetic, after the stomach had been cleared by the operation of the first dose. From the well known sympathy between the stomach and skin, my object was to have the

* This is the point to which I beg to direct the attention of my readers.

second dose retained, to excite nausea, and thereby a relaxation of the spasmodic state of the extreme vessels. When this could be accomplished, the disease certainly assumed a favourable turn; on the contrary, when no moisture or perspiration was excited, the unfavourable symptoms continued. In the few cases in which blood-letting was tried, the peculiar throbbing in the linea alba, with pain on the pressure, were the reasons, which induced me to have recourse to that depletion. The severity of the symptoms was certainly much abated by it." Having failed by the adoption of stimulants, Mr. B. observes: "The anti-spasmodic mixture caused frequently a burning sensation, and was seldom retained; I accordingly omitted the use of it. Reflecting also upon the number of cases, when, on dissection, acute *inflammation of the stomach had been found a concomitant of this disease, and conceiving that inflammation might be present, as was indicated by the great thirst, burning sensation, and painon pressure of the præcordia, and turgid eyes, the impropriety of farther continuing the use of stimulants, which were calculated to keep up and excite inflammatory action, presented itself forcibly to my view, and determined me no longer to pursue a method of practice which had so highly failed.*" The result of this mode of treatment fully proves its efficacy.

Dr. Campbell makes the following report on the use of milk and magnesia: "With regard to the utility of the magnesia and milk in the cure of the Epidemic, the few facts which have come under my own observation, or have been communicated to me by other medical officers who had tried it, dispose me to conclude, that the remedy is inadequate to the cure of this formidable disease, which evidently originates, not from the presence of an irritating matter in the stomach and first intestines, as is generally the case in Cholera Morbus, but from a general derangement or disorganization of the nervous and sanguiferous system; the restoration of which, to their proper functions, must be produced by some remedy more diffusible and general in its action than the above-mentioned. It is well known that magnesia is totally inert in the stomach, unless it meets and combines with an acid there, a substance, which, I believe, has never yet been detected in cases of the Epidemic."

Respecting his own practice, Dr. Campbell observes: " In this disease, the indications of cure were obvious. To those patients who had the burning sensation about the stomach, magnesia, with calomel, was exhibited in repeated doses, until the desired effect was produced; purgatives were then given ; of these, I found neutral salts, alone and in combination with senna, and the oleum ricini, the most useful. If the evacuations were not changed in appearance after the first dose of physic, calomel, in combination with pulvis antimonialis, was exhibited every three or four hours, with a laxative every morning, until the constrictions of the extreme vessels and the biliary organs yielded, when a flow of most brilliant yellow bile, scalding in its passage, succeeded. Bitters and laxatives were then used as required. In many cases, where there was much acidity in the primæ viæ, the evacuations changed after the first dose of magnesia and calomel, and a single purgative finished the cure. In many, where the presence of acid was not so obvious, the treatment was commenced by a large dose of ipecacuanha." This is contradictory, as just before Dr. Campbell says, that acid was a substance which he believed had never been detected in cases of the Epidemic.

Mr. Patterson reports : " The mode of treatment perfectly corresponds with the definition I have given of the disease ; and it is our grand object to prevent, check, or remove what I have considered the proximate cause of the disease, the increased and morbid secretion of gastric juice. For that purpose blood-letting, blisters, and tinct. opii are depended on, and when employed early in the disease, I am of opinion, they would seldom fail. The two first act in the same way by determining from the stomach and overcoming spasm. Tinct. opii is unrivalled in allaying inordinate action, or in restraining excessive discharges."

Dr. Cowen remarks : " In many instances bleeding was attended with most decided advantage, and where blood could not be obtained, which occurred in several cases, a most unfavourable result was to be apprehended. In some of the severe ones, the veins of both arms and jugulars were opened, the blood came by drops, and was of a black colour. In every case which occurred, when the patient was reported early, and before the circulation became languid, bleeding was had recourse to ; about 20 leeches

placed over the region of the stomach, and on their removal a large blister immediately applied. Where great irritability of th stomach prevailed, large doses of laudanum, both in a liquid and solid state, were administered; and during the period the stomach was under the influence of opium, calomel was freely given. Where we were fortunate enough to appease the irritable state of this organ, we had immediate recourse to purgatives."

Of the effects of stimulants, he says: "In many cases where collapse rapidly succeeded, to stimulate was impossible. Brandy, wine, camphor, and ammonia, were largely given without being able to excite any effect, either on the skin or circulation." On dissection, Mr. Cowen found the lungs, when cut into, full of dark venous blood; the brain exhibited marks of congestion, the vessels being distended, and the sinuses filled with fluid. In a few instances, the mucous membrane of the intestines exhibited patches to the extent of half a crown, where increased vascularity appeared; in many, the stomach and intestinal canal were distended, and completely filled with a fluid resembling congee water.

Among the detail of cases, to be brief, Mr. M'Lean gives three, successfully treated with calomel, laudanum, and bleeding, without stimulants. "As to the three cases of Cholera Spasmodica, which I have detailed, it is not necessary to say much; a perusal of them will sufficiently develope that I placed my chief indication of relief in the extraction of blood; and although I have not, in these cases now before you, pushed it to such length as on former occasions, the result is obviously much in favour of the system. I have no hesitation in saying, that even in the very last stage of the disease, in the robust European, and also the enfeebled native, it should form a principal in our ratio of treatment; no sinking of the pulse, or general appearances of debility should deter us. They are the consequences of over-action from an undue quantity of blood thrown on the abdominal and thoracic viscera, which are relieved by removing the cause. I am of opinion with Dr. Jackson, in saying, that by diminishing the quantity of blood, you increase the power of the circulating medium. In cases where the circulation has not become imperceptible at the wrist, you will observe a change in the pulse almost immediately, where actual syncope has not come on. The pulse gains

strength, but for some few minutes is much accelerated, and in less than a quarter of an hour after binding up the arm, it moderates in quickness, sometimes from 130 to 108, even 96, and becomes more full and natural."

Four cases are given by Dr. Irving, treated with large doses of calomel and laudanum, with bleeding ; they all recovered.

Such is the evidence given by the medical gentlemen on the Madras establishment on the use of sedatives. I shall now proceed to examine the reports at Bombay.

SECTION III.

BOMBAY REPORTS.

The first report is by Mr. Assistant Surgeon Wallace. He remarks: "The disease is most formidable; we have found the large doses of calomel, oil of peppermint, and laudanum, generally succeed in checking the purging and vomiting. But the most formidable symptoms are the sudden debility and coldness, which seem to indicate the use of the most powerful stimulants. The hot bath has been found very useful." This gentleman's third report states as follows: "I believe Mr. Corbyn's practice to be very efficacious, when adopted early. The majority of cases did not apply for relief until they had been attacked for some hours, and the medicines were almost invariably rejected, in common with every other liquid."

Dr. G. Burrell, Surgeon of the 65th Regiment, makes the following return. "It broke out on the 18th instant.

Admitted	21st,	1
	22nd,	6
	23rd,	6
	24th,	18
	25th,	22
	26th,	7
		60—died 4.

"On admission, I bled in every instance, in general to a good extent. Where universal spasm existed, venesection was carried ad deliquium, and the patient was at the same time put into a hot bath of 110°. The spasms were by these means invariably relieved, nausea and vomiting alleviated, so that the stomach bore the exhibition of calomel in scruple doses, combined with laudanum, which doses were frequently repeated; in short, the opium was

given under every denomination with calomel, and I believe the calomel will be found to rest on most stomachs per se."

The report from Mr. Surgeon Whyte states: "The practice I had followed, was that first recommended by Johnson*, and since by Mr. Corbyn, in which the corner stone and sheet anchor is calomel, in a dose of fifteen or twenty grains to an adult, according to his strength."

We now come to that of Mr. Assistant Surgeon Daws. His letter is directed to Dr. Jukes, at Tannah. He remarks as follows: "I presume you have seen the letter written by Mr. Corbyn, who had charge of the Native Hospital, centre division of the army, at Eritch, to Captain Franklyn, Assistant Quarter Master General of the same division. On this subject I could not perhaps do better than recommend you to pursue the plan of treatment therein laid down, as it is the same, with very little variation, that I have adopted, and you will be glad to hear that the success of my own practice tends to corroborate it."

Mr. Surgeon Craw in his report observes: "The calomel and laudanum plan, with most diffusible stimulants, and the hot bath, have been eminently successful; and if application is made within four or six hours from the first appearance of the disease, the cure is almost certainly effected." In another place he remarks, that "a bleeding quoad vires, the calomel and opiate, the hot bath, warm clothing, and frictions, spirituous or anodyne, form the chain of treatment in the European hospitals here, and these are repeated again as the symptoms may seem to demand. Under this plan, and an early application for relief, I think, the disease is not fatal in more than one in a hundred cases."

The following report is from Mr. Assistant Surgeon Campbell, of the 22nd Dragoons: "The scruple dose of calomel, with Corbyn's anodyne draught, was given every two hours, but when the spasms and vomiting had ceased, the laudanum was omitted, the calomel continued, and the stimulants† more frequently given."

* Referring to the scruple dose of calomel given to a seaman.

† Stimulants in the shape of cordials were given after the disease had been removed, with a view of restoring the lost strength. See the Medical Board's preface, at their summing up of the mode of treatment adopted.

Mr. Tod reports: "The way I have administered medicine is by giving calomel, one scruple, and washing it down with tinctura opii one drachm, and water two ounces, and repeating them after an hour, if the first dose is rejected. I have sometimes left the interval of an hour, which generally succeeds, but I have in a few instances, been under the necessity of giving it three or four times." In another place, this gentleman adds: "I have had altogether a hundred cases, where the calomel and opium plan has been followed, and though ten or twelve have died, these were either such aged subjects that no rational hope of recovery could be entertained, or were brought in such an advanced stage of the complaint as to be beyond the power of medicine."

Mr. Assistant Surgeon Milwood makes the following remarks in his report: "I will now give my treatment, with my reason for the addition I have made to Mr. Corbyn's. There are two great objects to be attained for the recovery of the patient: 1st, to allay the vomiting and purging; 2nd, to restore the pulse and heat of the extremities, and produce sleep. In order to effect these, I have, in addition to one scruple of calomel, put five grains of antimonial powder, and added to the draught one drachm of spt. æther, nitros, &c. In the course of two hours, I give ten grains of calomel and five of antimonial powder, with half the draught, which I prepare with camphor mixture, in place of plain water, and repeat this as it is required. The best laxative, I have found to be carbonate of magnesia, four scruples. It remains on the stomach, and generally causes two or three plentiful evacuations."

Mr. Assistant Surgeon Richards reports as follows: "Punderpoor, 3rd August, 1818.—Up to this morning, the admissions amount to 170, out of which eight casualties have occurred." This gentleman bled, and used the calomel and laudanum doses.

To evince how essentially necessary bleeding is, Dr. Burrell sends the following return:

Bled	88	died	2
Not bled	12	died	8
Total admitted	100		

I now come to Mr. Surgeon Longdill's report; he observes: "My general plan of treatment was to give the dose recommended

by Mr. Corbyn. If it was rejected, another was given after waiting an hour, with the warm bath, which generally relieves the patient; after which they required little else but cordials and a gentle laxative."

Mr. Surgeon Robertson, of the European Regiment, on the Bombay Establishment, in his report states, that bleeding relieved the patients; and that calomel and opium brought them quite round.

The report which succeeds, is from Mr. Surgeon Gordon: "I sent you a report, in which I stated, that I laid considerable stress on free and early blood-letting. Since then I have had eleven cases, bled the whole of them, then opened the bowels, and they are all quite well."

Mr. Surgeon Coates reports to the president of the Medical Board, that "The practice followed in the treatment of this disease at Aurungabad, was that recommended by Mr. Corbyn, and had been particularly successful; indeed, if the patient applied in time, it was considered as infallible."

Mr. Surgeon Jukes reports: "That experience has now taught us, that a very large proportion of those attacked by the disease recover by the calomel and laudanum alone; but I feel satisfied that there are many aggravated cases, wherein nothing but the most prompt and decided use of the lancet could possibly save the patient."

The next report comes from Dr. Taylor, a gentleman, who had the principal practice in the disease at Bombay. This practice is precisely similar to the foregoing; he gives the following return.

Medicine administered to	7,459
Of whom died	441

being a proportion of nearly six to a hundred.

The last report is from George Ogilvy, Esq. secretary to the Medical Board, confirming the treatment already mentioned.

I believe I have now satisfactorily proved the efficacy of the treatment I recommended. In conclusion it will be sufficient to add the remarks of the Medical Board of Bombay, after summing up the whole of the opinions regarding the proper mode of treatment to be adopted.

"On the subject of the cure of the disease, we need say but little. The practice so judiciously and speedily adopted by Dr. Burrell in the 65th Regiment clearly proves, that in the commencement of the disease in Europeans, blood-letting is the sheet anchor of successful practice, and perhaps also with the natives. Provided it can be had recourse to sufficiently early in the disease, and as long as the vital powers remain, so as to be able to produce a full stream, it ought never to be neglected; it being sufficiently proved, that the debility so much complained of, is merely apparent. Calomel, as a remedy, certainly comes next in order, and when employed in proper doses, with the assistance of opium, more particularly in the early stage of the disease, seems to be equally effectual among the natives as venesection among the Europeans, in arresting its progress. In all the cases formerly alluded to, when we met with the disease in its first attack, a single scruple of calomel with 60 minims of laudanum, and an ounce of castor oil, seven or eight hours afterwards, was sufficient to complete the cure. The practice of this place sufficiently appears from Dr. Taylor's report, and bears ample testimony to the control which calomel possesses over this disease. All other remedies must in our opinion be considered as mere auxiliaries, no doubt extremely useful as such, and ought never to be neglected, particularly the warm bath and stimulating frictions."

APPENDIX.

No. 1.

Return of Cholera Cases treated in His Majesty's 14th Regiment Hospital, from 14th to 31st March, 1828.

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
Richard Evans,	14th, 2 A.M.	7 A. M.	Purging, vomiting, and pain across the belly, pulse scarcely to be felt, features collapsed, spasms and cramps, and sinking.	Calomel in scruple doses, with laudanum, frictions, blister to the scrobiculus cordis, magnesia for the vomiting, bled to oz. xiv. effervescent draughts, afterwards purgatives.	... ...	Convalescent.
James Gower, –	15th, 8 P.M.	11 P. M.	Severe vomiting, purging of watery fluid, cramps in legs, oppression, very low, countenance sunk, extremities cold, voice faltering, pulse not to be felt.	Calomel in scruple doses, with laudanum, blister to the abdomen, magnesia for the vomiting, frictions, camphor, ammonia, and opium pills, warm brandy and sago.	16thMar.	
James Murphy,	15th, 1 A.M.	6 A. M.	Purging, vomiting, with cramps, pulse feeble, extremities cold, restlessness and thirst, great agony and distress, stools watery.	Calomel in scruple doses with laudanum, was bled to oz. xxvi. magnesia for the vomiting, frictions, afterwards small doses of calomel and antimony.	... ...	Discharged well.
George Long,––	16th, 1 P.M.	6 P. M.	Griping, pain in belly and epigastrium, anxiety, oppression, restlessness, nausea, sickness, and purging, pulse feeble, also vomiting of watery fluid.	Bled twice, calomel in large doses, afterwards calomel, antimony, and purgatives.	.. ...	Discharged well.

Thomas Hughes,	16th 5 A. M.	8 A. M.	Seized with giddiness, vomiting, purging, and griping, extremities cold, eyes sunk, no pulse, voice scarcely audible, sinking.	Large doses of calomel with laudanum, blister to the abdomen, frictions, warm brandy and sago.	16th Mar.	
Joseph Clarke,–	16th 12 P. M.	5 P. M.	Severe vomiting and purging, heaviness at the stomach, pulse quick and feeble, sinking.	Bled to oz. xx. large doses of calomel, magnesia for the vomiting, fomentations, afterwards purgatives.	... ...	Discharged well.
George Deane,–	16th 2 P. M.	3 P. M.	Severe vomiting and purging, pain in the scrobiculus cordis, restlessness, pulse nearly gone, spasms, eyes sunk, extremities cold, sinking.	Bled to oz. xiv. calomel in scruple doses, with laudanum, blister to the chest, magnesia for the vomiting, frictions, warm brandy and sago.	16th Mar.	
Thomas Purcell,	16th 6 A. M.	8 P. M.	Vomiting and purging, giddiness in head, quite exhausted, pulse feeble, no cramps, eyes sunk.	Bled to oz. xx. large doses of calomel, afterwards purgatives.	... ...	Discharged well.
Joseph Kettridge,	16th 5 P. M.	8 P. M.	Purging, vomiting, and pain in the right side, severe cramps in his legs, pulse quick but small, great restlessness and thirst.	Bled to oz. xx. large doses of calomel with laudanum, blister to the epigastrium, frictions, anodyne enemas, afterwards small doses of calomel and antimony, warm sago and brandy.	... ...	Doing well; convalescent.
William Hollis,	16th 8 P. M.	11 P. M.	Pain about the epigastrium, nausea, pulse quick, countenance flushed, severe vomiting and purging, no cramps.	Bled twice, calomel in scruple doses, blister to the epigastrium, magnesia for the vomiting, afterwards purgatives.	... ...	Discharged well.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
John Herd,	16th 10 P. M.	11 P. M.	Suddenly seized with griping, vomiting, and purging, pain about the epigastrium, cramps in his legs, pulse quick but small, skin cold, eyes sunk.	Bled to oz. xx. calomel in scruple doses with laudanum, blister to the epigastrium, magnesia for the vomiting, anodyne enemas, afterwards small doses of calomel and antimony, purgatives.	... ...	Watery purging continued for several days, with great debility and swelling of feet, convalescent.
James Edwards,	16th 10 A. M.	2 P. M.	Vomiting and purging, pulse feeble, restlessness, extremities cold, sinking, oppression, countenance sunk.	Bled to oz. xiv. calomel in scruple doses with laudanum, magnesia for the vomiting, calomel and antimony in small doses, sago and wine.	17th Mar.	
John Shirley,	17th 2 A. M.	5 A. M.	Vomiting, purging, cramps, cold sweats, no pulse, much sunk, look haggard, clammy feel of skin, pain at epigastrium and belly.	Calomel in scruple doses, with laudanum, hot frictions, blister to the epigastrium, warm baths, magnesia for the vomiting, sago and brandy, afterwards calomel, antimony, and purgatives.	... ...	Discharged well.
John Casey,	17th 10 P. M.	11 P. M.	Seized with pain in epigastrium, vomiting but no purging, pulse quick, skin hot, cramps occasionally.	Bled to oz. xx. calomel in scruple doses, blister to the epigastrium, magnesia for the vomiting, friction, afterwards small doses of calomel, antimony, and purgatives.	... ...	Convalescent.

Henry Cavanaugh,	17th 5 A. M.	8 A. M.	Vomiting and purging, pulse feeble, skin hot, countenance a little altered, and great thirst.	Bled to oz. xxx. scruple doses of calomel, afterwards purgatives.	... .	Discharged well.
George Baxter,	17th 7 A. M.	12 A. M.	Severe pain in stomach with vomiting and purging, cramps in his legs, pulse small and feeble, sinking, eyes sunk.	Bled to oz. xx. calomel in scruple doses with laudanum, frictions, blister to the epigastrium, warm brandy and sago.	17th Mar.	
John Butterworth,	17th 12 A.M.	2 P. M.	Purging, vomiting, pain in abdomen, extremities cold, pulse scarcely perceptible, countenance sunk, voice feeble.	Scruple doses of calomel with laudanum, blister to the chest, frictions, warm brandy and sago.	17th Mar.	Had a severe attack in Fort William.
Henry Moore, –	17th 11 A.M.	2 P. M.	Pain in stomach, anxiety, sinking, griping, purging and vomiting, pulse quick.	Bled to oz. xx. calomel in large doses, magnesia for the vomiting, afterwards calomel, antimony, and purgatives.	... ...	Discharged well.
Chr. Travesick,	17th 4 P. M.	5 P. M.	Bilious vomiting, frequent watery stools, anxious, restless, faint, pain at the epigastrium, great thirst, pulse quick, and sinking fast.	Bled to oz. xx. scruple doses of calomel with laudanum, afterwards calomel, antimony, and purgatives.	... ...	Discharged well.
Thos. Carrotts, –	17th 11 A.M.	8 P. M.	Vomiting, cramps, pulse quick and full, skin hot, pain in abdomen, chest and head.	Bled to oz. xx. scruple doses of calomel, blister to the neck, and purgatives,	... ...	Discharged well.
William Moore,	17th 1 A. M.	8 P. M.	Seized with severe pain in stomach, violent vomiting and purging, sinking, hands cold, pulse not to be felt, cramps of neck and upper extremities.	Bled to oz. xx. scruple doses of calomel with laudanum, blister to the breast, frictions, warm sago and brandy.	21st Mar.	

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
Thomas Dodson,	17th 10 A.M.	7 P. M.	Pain at the epigastrium, very low and sunk, nausea, (had cholera at Muttra,) pulse full.	Bled three times, calomel in large doses, magnesia for the vomiting, small doses of calomel, antimony, and purgatives.	... ...	Discharged well.
George Wyatt,–	18th 1 A. M.	4 P. M.	Purging and vomiting, pain in stomach, cramps, pulse quick but feeble, countenance flushed.	Bled to oz. xxx. scruple doses of calomel, magnesia for the vomiting.	... ...	Discharged well.
James Gray,—–	18th 5 A.M.	7 A. M.	Griping, pain in belly, purging with vomiting, cramps at epigastrium, stools watery, pulse full, anxious, green vomiting, &c.	Bled to oz. xxx. scruple doses of calomel with a grain of opium, magnesia for the vomiting, afterwards calomel, antimony in small doses, with purgatives.	... ...	Discharged well.
Edward Rossee,	18th 7 A.M.	1 P. M.	Griping, nausea, pain in head, watery stools, anxiety and restlessness, pulse quick, sinking.	Bled to oz. xxx. scruple doses of calomel, fomentations, magnesia for the vomiting, afterwards purgatives.	... ...	Discharged well.
John Davis, —–	18th 5 A.M.	11 A. M.	Purging and severe vomiting of watery fluid, pain in belly, extremities cold, great restlessness, cramps, countenance sunk, is apparently sinking fast, pulse not to be felt.	Calomel in scruple doses with opium, magnesia for the vomiting, frictions, blister to the abdomen, stimulant draughts, brandy and sago.	18th Mar.	

George Lack, —	18th 1 P. M.	3 P. M.	Vomiting and purging, great pain in belly, restlessness, pulse feeble, thirsty, faintness, anxiety, distress, too ill to give an account of himself.	Bled twice, scruple doses of calomel with laudanum, blister to the chest, friction, afterwards calomel, antimony in small doses, with purgatives.	...	...	Discharged well.
James Lawson, —	18th 1 P. M.	3 P. M.	Pain in head and stomach, vomiting with restlessness, no purging, pulse quick, anxiety and distress of countenance	Bled three times, large doses of calomel, afterwards calomel and antimony in small doses, with purgative fomentations.	...	...	Convalescent.
John Beasley, —	18th 5 P. M.	7 P. M.	Pain about the stomach, with violent purging, vomiting of watery fluid, pulse quick, cold sweats, countenance sunk.	Bled to oz. xxv. large doses of calomel with laudanum, blister to the breast, frictions, magnesia for the vomiting, other laudanum and ammonia draughts.	21st Mar.		
Thomas Radsford,	18th 5 P. M.	7 P. M.	Pain in stomach with vomiting, and purging, pulse quick, skin hot.	Bled to oz. xxx. large doses of calomel, afterwards purgatives.	...	..	Discharged well.
William Topham,	18th 2 P. M.	8 P. M.	Pain in stomach with vomiting, pulse quick, skin warm.	Scruple doses of calomel, bled to oz. xx. afterwards purgt.	...	...	Discharged well.
George Aldbury,	18th 5 P. M.	10 P. M.	Pain in abdomen with vomiting, pulse quick, skin hot, violent cramps in legs, great thirst, agonizing tremors.	Bled twice, large doses of calomel with laudanum, magnesia for the vomiting, blister to the breast, warm brandy and sago, afterwards small doses of calomel and antimony, with purgatives.	...	...	Drunk, exposed to the sun, absent from cantonment all day, bled to oz. xl. with immediate relief.
William Lepper,	18th 8 P. M.	12 P. M.	Pain in belly and epigastrium with faintness, seems very low, pulse quick, tongue foul, great anxiety.	Bled to oz. xx. purgatives.	...	...	Discharged well.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
Samuel Marvin,	19th 11 A.M.	2. P. M.	Vomiting and purging, pain at the epigastrium, pulse quick, looks anxious and restless, cramps, feet cold, collapsed, sinking, oppression at pericardium.	Bled to oz. xxx. large doses of calomel, magnesia for the vomiting, blister to the scrobiculus cordis, frictions, warm brandy and sago.	20th Mar.	
John M'Crea,—	19th 11 A.M.	1 P. M.	Pain in stomach, nausea, pulse quick, skin warm, seems very uneasy, great thirst.	Bled to oz. xv. scruple doses of calomel and antimony, ipecacuanha enemas, and purgatives.	... ...	Discharged well.
Michael Brady,	19th 1 P. M.	2 P. M.	Pain in stomach with vomiting, pulse quick, skin warm, face flushed, great thirst.	Bled twice, scruple doses of calomel with laudanum, magnesia for the vomiting, afterwards calomel and antimony, and blister to the neck.	... ...	Doing well.
Anthony Murray,	19th ½5 P.M.	6 P. M.	Vomiting and purging, restless and very anxious, pain in epigastrium, great thirst, pulse feeble, cramps of legs and loins, vomiting of white fluid, too ill to give an account of himself.	Scruple doses of calomel with laudanum, blister to the scrobiculus cordis, magnesia for the vomiting, frictions, warm sago and brandy, afterwards small doses of calomel, antimony, and purgatives.	... ..	Discharged well.

John Howe,	19th 8 P. M.	9 P. M.	Pain in chest and limbs, purging, great restlessness, pulse quick, distress, retching, pain and oppression came on suddenly with giddiness and faintness.	Calomel in scruple doses, magnesia for the vomiting, anodyne enemas, afterwards small doses of calomel and antimony with purgatives.	..	...	Discharged well.
Edward Moore,	19th 10 P.M.	12 P. M.	Giddiness, vomiting green bitter fluid, pain in epigastrium, pulse feeble, tongue foul, no purging, great thirst.	Large doses of calomel, magnesia to prevent vomiting, afterwards purgatives.	...	...	Discharged well.
James Watts,	20th.	$\frac{1}{2}$2 P. M.	Vomiting of watery billious fluid, purging, pain in pericardium and belly, restlessness, anxious and faint, sinking, pulse feeble.	Scruple doses of calomel, blister to the scrobiculus cordis, magnesia for the vomiting, frictions, afterwards purgatives.	..	...	Discharged well.
Thomas Gray,	20th 5 A. M.	6 P. M.	Vomiting of green, bitter, bilious, watery fluid, purging and pain at pericardium and belly, slight cramps, oppression, collapsed pulse, feeble, much sunk.	Calomel in scruple doses with opium, blister to the chest, magnesia for the vomiting, afterwards small doses of calomel, antimony, and purgative.	...	...	Discharged well.
John Whitehead,	20th $\frac{1}{2}$1 A.M.	11 A. M.	Vomiting and purging, giddiness in head, cramps in limbs, pain in stomach, low and distressed, pulse nearly gone.	Calomel in scruple doses with laudanum, magnesia for the vomiting, blister to the stomach, frictions, afterwards calomel, antimony, and purgative.	...	...	Discharged well.
Thomas Thompson,	20th 8 P. M.	11 P. M.	Giddiness and pain in head, vomited bitter and watery fluid, feels low and depressed, no purging, pulse scarcely to be felt, skin cool.	Scruple doses of calomel with laudanum, blister to the stomach, magnesia for the vomiting, frictions, afterwards gentle purgatives.	...	...	Discharged well.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
William King, –	20th 8 A. M.	10 A. M.	Giddiness in head, pain in epigastrium, nausea, purging, cramps in legs, restlessness, feels very low, pulse feeble, suddenly attacked.	Large doses of calomel with laudanum, blister to the epigastrium, magnesia for the vomiting, afterwards small doses of calomel, antimony, and a purgative.	... ...	Discharged well.
George Ochiltree,	21st 2 A. M.	8 A. M.	Vomiting, violent cramps, pulse feeble, no purging, during convalescence green bilious purging.	Scruple doses of calomel with laudanum, bled three times, magnesia for the vomiting, frictions, and calomel, antimony.	... ...	Convalescent.
Basil Leggins, –	21st 7 P. M.	10 P. M.	Vomiting, succeeded by purging, pain in limbs, cold sweats, pulse feeble, oppressed, great thirst, sinking.	Scruple doses of calomel with laudanum, magnesia for the vomiting, effervescent draughts, blister to the epigastrium and spine, stimulating draughts, warm brandy and sago.	28th Mar.	Continued collapsed for five days, then became delirious, heat returned to the extremities; but suddenly died.
Charles Cavanaugh,	21st 7 A. M.	11 A. M.	Purged, pain in epigastrium, has been vomiting, pulse feeble, voice faltering, looks oppressed and harassed, frequent cramps, stools white and watery, voice weak, great thirst.	Scruple doses of calomel, blister to the chest, magnesia for the vomiting, frictions, warm brandy and sago, afterwards purgatives.	... ..	Convalescent.

Thos. Coxhill, –	21st 5 A. M.	½3 P. M.	Severe vomiting and purging, very low, can scarcely give any account of himself, extremities cold, apparently sinking, cold sweats, pulse scarcely to be felt.	Scruple doses of calomel with laudanum, magnesia for the vomiting, anodyne draughts with æther, frictions, warm wine and sago.	22nd Mar.	
Thos. Lepper, –	22d 6 P. M.	7 P. M.	Purging and vomiting, seems low and exhausted, pulse feeble, respiration, great thirst.	Scruple dose of calomel with opium.	... ...	Discharged well.
Owen M'Dermott,	22d 7 A. M.	6 P. M.	Purging during the day, stools watery, exhausted, pulse quick and full, eyes sunk.	Bled to oz. xx., scruple doses of calomel, afterwards gentle purgatives.	... ...	Discharged well.
Wm. Foreman,	22d 4 P. M.	7 P. M.	Taken faint on parade with vomiting, looks oppressed, pulse feeble.	A scruple dose of calomel, and purgative.	... ...	Discharged well.
James Budding,	22d 5 A. M.	11 A. M.	Severe vomiting and purging, cramps, cold sweats, stools watery, pulse feeble, skin cold and clammy, very low, and thirsty.	Scruple doses of calomel, magnesia for the vomiting, anodyne enemas, frictions, blister to the breast and neck, stimulating draughts, warm sago and brandy, afterwards calomel and antimony.	26th Mar.	
John Needs, ——	22d 12 A.M.	5 P. M.	Constant vomiting, purging of watery fluid, pain in belly, oppressed and extremely weak, skin cold and clammy, pulse feeble, voice sunk, cramps in legs.	Small doses of calomel with opium, stimulating draughts every two hours, magnesia for the vomiting, frictions, blister to the epigastrium, warm sago and brandy.	23d Mar.	
Joseph Dunkley,	22d 10 A. M.	8 P. M.	Purging and vomiting, slight cramps in legs, pain at epigastrium, pulse feeble, stools white like milk, oppression and anxiety.	Scruple dose of calomel with opium, calomel in small doses, warm wine and sago.	... ...	Discharged well.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
Serj. W. Moore,	22d 6 P. M.	8 P. M.	Seized with vomiting and purging, countenance pale, pulse feeble, skin moist, no pain, great thirst.	Anodyne draughts, large doses of calomel, magnesia for the vomiting, blister to the epigastrium, and small doses of calomel and antimony.	... ...	Discharged well.
Thomas Garret,	22d 6 A. M.	7 P. M.	Purging and vomiting, cramps, appears low and dejected, pulse quick.	Scruple doses of calomel with laudanum, magnesia for the vomiting, frictions, fomentations, sago and wine, small doses of calomel and antimony, and purgatives.	... ...	Convalescent.
Robert Thomas,	22d 6 P. M.	10 P. M.	Pain in stomach, succeeded by vomiting, pulse quick, slight cramps, excessive thirst.	Bled to oz. xx., scruple doses of calomel with laudanum, afterwards calomel and antimony, purgatives.	... ...	Convalescent.
Thomas Sharpe,	23d 9 P. M.	10 P. M.	Vomiting, pain in the epigastric region, pulse small, skin cold, great thirst.	Scruple dose of calomel with opium, magnesia for the vomiting, calomel, antimony in small doses, anodyne enemas.	... ...	Discharged well.
Thos. Johnson,..	23d 9 A. M.	½11 A. M.	Pain in head with giddiness, looks anxious, purging but no vomiting, great thirst, pain at the epigastrium, pulse quick, nausea.	Bled twice, small doses of the calomel and antimony, anodyne enemas, gentle purgatives.	... ...	Convalescent.

Samuel Ross, —	23d 9 A. M.	10 P. M.	Pain in chest and epigastrium, vomiting and purging, pulse full, anxious and restless, skin damp and clammy.	Bled to oz., xvi. scruple doses of calomel with laudanum, enema anodyne.	... ...	Convalescent.
John Mills, —	23d 12 P. M.	10 A. M.	Vomiting and purging, pain at the epigastrium, great restlessness, cold damp skin, pulse soft, collapsed, sinking, reduced, anxious.	Scruple doses of calomel, blister to the scrobiculus cordis and spine, fomentations, frictions, and warm brandy and sago.	24th Mar.	
Jeremiah Fretter,	23d 7 A. M.	9 A. M.	Severe head-ache, pain in stomach, with bilious vomiting, pulse quick, eyes red.	Bled to oz., xx., scruple doses of calomel, magnesia for the vomiting, blister to the scrobiculus cordis, small doses of calomel and antimony, effervescent draughts.	... ...	Convalescent.
James Willis, —	In hospital.	reported at 10 A. M.	Vomiting and purging, restlessness, skin cold and clammy, pulse not perceptible, countenance sunk, collapsed.	Large doses of calomel with opium, frictions, blister to the epigastrium, stimulating draughts, warm brandy and sago.	23d Mar.	Sixteen days in hospital with bubo: well at 7 A. M. sinking at 10, and died at 7 P. M.
Thomas Cooper,	24th 5 A. M.	2 P. M.	Purging and vomiting, pulse feeble, skin cold and clammy, cold sweats, collapsed, great thirst, voice changed, eyes heavy and sunk.	Anodyne enemas, scruple doses of calomel with opium, frictions, blister to the scrobiculus cordis, afterwards small doses of calomel and opium, warm brandy and sago.	25th Mar.	
Patrick Carey, —	24th 1 P. M.	5 P. M.	Vomiting and purging, cramps in thighs, restlessness, pulse quick, anxious and oppressed.	Calomel and opium in small doses, magnesia for the vomiting, frictions, blister to the scrobiculus cordis, afterwards calomel, antimony, sago and wine.	... ...	Convalescent.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
James Stopps, --	24th ½5 A. M.	8 A. M.	Fainted on parade, very low, has been vomiting, feeble pulse, skin warm, giddiness, anxious looks, depressed.	Scruple doses of calomel, calomel and antimony in small doses, wine and sago.	... ...	Discharged well.
Wm. M'Leland,	24th 9 P. M.	½ 10 P. M.	Pain in stomach with vomiting, pulse quick, feet cold, cramps of hands, legs, thighs, muscles of the neck and chest, pain at epigastrium.	Scruple doses of calomel with opium, magnesia for the vomiting, blister to the scrobiculus cordis, bled to oz. xx.	... ...	Convalescent.
Dun. M'Intosh,	24th 5 A. M.	10 A. M.	Pain in belly, has been vomiting green, bilious matter, pulse quick, skin clammy.	Scruple doses of calomel, blister to the epigastrium, frictions, bled to oz. xx. afterwards small doses of calomel and antimony, anodyne enemas.	... ...	Convalescent.
Mich. Whitaker,	24th.	2 A. M.	Giddiness, nausea, great thirst, pain in head, pulse quick, cramps in legs.	Bled twice, large doses of calomel.	... ...	Convalescent.
Henry Turner, --	24th.	6 P. M.	Vomiting and purging, tongue foul, skin clammy and moist, countenance flushed, pulse quick.	Scruple doses of calomel with opium, magnesia for the vomiting, bled to oz. xxv.	... ...	Convalescent.
Simon Leonard,	24th 10 A. M.	25th 2 A. M.	Violent cramps in feet, legs, and abdomen, eyes sunk, cold sweat, pulse gone, great restlessness, sinking.	Scruple doses of calomel with opium, frictions, blister to the scrobiculus cordis, warm brandy and sago.	25th Mar.	

Joseph Sylvester,	25th 5 A. M.	3 P. M.	Purged to-day, faint; sunk low, nausea, retching, and pain at epigastrium and chest, stools watery, great sinking on sickness.	Calomel in small doses, anodyne enemas, Dover's powder, purgatives, and tonics.	..	...	Doing well.
George Harle, –	26th 5 A.M.	1 P. M.	Seized with watery purging, vomiting of watery fluid, looks sunk and depressed, pain and heaviness at stomach, tongue white, pulse feeble, skin clammy.	Small doses of calomel with opium, anodyne enemas, blister to the scrobiculus cordis, small doses of Dover's powder, magnesia for the vomiting.	...	...	Convalescent.
John Atkins, —	26th 9 P. M.	11 P. M.	Vomiting of watery, conjee-like fluid, pain at stomach and epigastrium, has been purged since, eyes heavy and red, pulse feeble, skin cold, cramps in legs.	Large doses of calomel with opium, magnesia for the vomiting, blister to the breast, afterwards small doses of calomel with opium, antimony, and calomel, and purgatives.	..	...	Convalescent.
John Ward,——	26th 6 P. M.	7 P. M.	Faint and languid, pain at the stomach and epigastrium, has been purged, no vomiting, pulse regular but weak, tongue white.	Scruple dose of calomel, afterwards small doses of calomel and antimony, purgatives.	...	...	Doing well.
John Shell,——	27th 8 A. M.	10 P. M.	Seized with severe vomiting of bilious matter, succeeded by watery stools, oppressed, very low and dejected, pulse feeble, severe cramps in legs and thighs, cold sweats, skin clammy, pain and heaviness at the epigastrium.	Small doses of calomel with opium, frictions, anodyne enemas, stimulating draughts, blister to the epigastrium, brandy and sago.	...	...	Doing well.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
John Rickett, ~	28th 8 A. M.	9 A. M.	Seized with vomiting, succeeded by bilious purging, severe cramps in legs, griping pain about the epigastrium, eyes red and heavy, skin cold and damp, great thirst, pulse feeble.	Blister to the scrobiculous cordis, large doses of calomel with opium, anodyne enema.	... ...	Convalescent.
Mat. Darlow, ~	28th 6 P. M.	8 P. M.	Purging, vomiting of bilious matter, pain at the stomach, pulse quick, great restlessness.	Bled twice, scruple doses of calomel with opium.	... ...	Convalescent.
John Baker, ~~	28th 7 P. M. of the 27th.	26 9 A. M.	Giddiness, with pain in head and epigastrium, vomiting of bilious matter, severe purging, great thirst, pulse feeble, skin moist and damp, looks pale and dejected.	Small doses of calomel with opium, frictions, blister to the breast, anodyue enemas, magnesia for the vomiting, bled to oz. xv., afterwards purgatives.	.. ...	Convalescent.
Fred. Hobbs, ~	28th 5 P. M.	11 P. M.	Pain in belly and epigastrium, purging, and vomiting of watery fluid, pulse feeble, great thirst, low and dejected, tongue foul, slight cramps.	Calomel in scruple doses with opium, blister to the breast, frictions, magnesia for the vomiting, anodyne enemas.	... ...	Doing well.
James M'Cullough,	28th 5 P. M.	6 P. M.	Complains of heaviness at the epigastrium, vomiting and purging, giddiness in head, pulse quick, skin moist.	Scruple doses of calomel with opium, bled to oz. xvi., afterwards gentle purgatives.	... ..	Convalescent.

Jacob Carlisle,	28th 10 P.M.	11 P. M.	Seized with giddiness and thirst, with sensation of weakness, pulse quick but languid, low and dejected.	Scruple dose of calomel, and gentle purgatives.	... ...	Convalescent.
Daniel Jordan,	28th 1 A. M.	7 A. M.	Taken faint on parade, with heaviness at the stomach, seems low and dejected, pulse feeble.	Small doses of calomel and gentle purgatives, bled twice.	... ...	Doing well.
Ezekiel Boot, –	28th 7 P. M.	9 P. M.	Attacked with vomiting, succeeded by severe cramps in legs, pain at the stomach, pulse quick and full, skin hot, great thirst.	Bled to oz. xxx., scruple doses of calomel, afterwards small doses of calomel and antimony, gentle purgatives.	... ...	Convalescent.
Timothy Silby,	29th 5 A. M.	8 A. M.	Taken with vomiting, pain at epigastrium, eyes heavy and red, great restlessness, pulse feeble, great thirst.	Bled to oz. xv., scruple doses of calomel, afterwards gentle purgatives.	... ...	Convalescent.
John Martin, –	29th 3 A. M.	½8 A. M.	Great anxiety, distress and sinking, purging of foul fæces, vomiting of watery fluid, severe pain at epigastrium, cramps in his legs, pulse feeble, countenance sunk, voice changed, skin cold and clammy, apparently sinking fast.	Small doses of calomel with laudanum, blister to the scrobiculus cordis, frictions, anodyne enemas, stimulating draughts, brandy and sago.	29th Mar.	A very delicate subject, had a severe attack of remittent fever in Dec. and dysentery in January.
David Pratt, —	29th 3. M.	6 A. M.	Severe pain at the epigastrium, succeeded by vomiting and purging, pulse feeble, skin cool, restlessness.	Scruple doses of calomel with opium, and gentle purgatives.	... ...	Convalescent.

Return of Cholera Cases treated in His Majesty's 14th Regt. Hospital, from 14th to 31st March 1828, (continued.)

Names.	*When attacked.*	*When sent to Hospital.*	*State of Disease on Admission.*	*Remedies employed.*	*When died.*	*Remarks.*
Mich. Buckley,	29th 5 A.M.	7. P. M.	Vomiting and purging of watery stools, vomiting of watery conjee-like fluid, severe pain in belly and epigastrium, violent cramps of the muscles of the legs and thighs, distress of countenance, eyes heavy, pulse feeble:	Calomel in small doses with opium, frictions, blister to the scrobiculus cordis, stimulating draughts, anodyne enemas, magnesia for the vomiting, brandy and sago.	... ...	Doing well.
William Monks,	29th ¼ 12 P. M.	12 Noon.	Eyes heavy and languid, countenance distressed, faintness, vomiting of muddy sliney fluid, severe pain at epigastrium and belly, great oppression, cramps in feet and legs, pulse slow and feeble, skin moist, great thirst.	Scruple doses of calomel with laudanum, blister to the scrobiculus cordis, sago and wine, afterwards small doses of calomel and antimony.	... ...	Convalescent.
Joseph Lowe,...	29th.	11 P. M.	Taken with violent cramps, seems in agony, vomiting of watery fluid, burning pain at the epigastrium, pulse feeble, skin warm.	Bled twice, scruple doses of calomel, gentle purgatives.	... ..	Doing well.
James Hailes,...	29th 12 P.M.	30 4 A. M.	Severe purging of watery fluid, vomiting of thick bilious matter, pulse feeble, pain at the scrobiculus cordis,	Scruple doses of calomel with opium, magnesia for the vomiting, blister to the scrobiculus cordis, anodyne ene-	30th Mar.	

			much oppression, great debility, eyes languid, sinking, cold sweats, respiration laborious, great thirst.	mas, stimulating draughts, frictions, sago and brandy.			
William Scott,—	30th 5 A. M.	6 A. M.	Taken faint on parade, pain in his head and back, slight vomiting, uneasiness, pulse quick, skinnatural, giddiness, great thirst.	Calomel in a scruple dose, small doses of calomel and antimony, and gentle purgatives.	...	...	Doing well.
George Pollard,—	30th 11 A. M.	1 P. M.	Looks very languid and stupid, respiration laborious, purging of yellow watery stools, vomiting of bitter bilious matter, pain in left side, and heat at the epigastrium, faintness, great thirst, pulse full and soft, tongue white.	Small doses of calomel with opium, anodyne enemas, blister to the epigastrium, magnesia for the vomiting, gentle purgatives, warm sago and wine.	...	...	Doing well.
John White,——	31st.	8 P. M.	Pain at the stomach with nausea, head-each, uneasiness, pulse quick, skin dry, countenance flushed, great thirst.	Scruple dose of calomel, bled twice purgatives.	...	...	Doing well.

No. II.

Report of Cases of Cholera, given by Mr. S. W. Lister.

The cases and dissections were written by Mr. Foster; and I have taken the liberty to add some remarks at the end of each.

CASE 1.—Richard Royce, ætatis 18, admitted June 11th, noon. For the last 3 or 4 days he had a watery purging and occasional griping, which was relieved by every successive evacuation. This morning at 8 o'clock he felt worse, threw up his breakfast, and had two watery stools. His whole body is under the natural heat, especially his hands and arms. Countenance ghastly, eyes sunk, voice feeble, lips livid, pulse 110 and small. He complains of no pain, is not thirsty, calls for nothing. V. S. ad ℥xxiv; et habeat statim calomel. gr. xv. c. tinct. opii gt. xl, aquæ menthæ pip. ℥ij. Sumat, pro re nata, spts. vin. Gall. ʒij, aqua calida commixt. Applicr. abdomin. et suris cataplasm. sinapeos. Hot sand bags to extremities. 2 P. M. Twenty ounces of blood were extracted with difficulty. Hands are cold as ice, and pouring out sweat. He has had but one scanty stool, and vomited but once a small quantity of conjee-like fluid. He still makes no complaint; pulse 130, extremely feeble. Rept. spts. vin. Gall. 4 P. M. He had but two stools since last report, and vomited only once, and in small quantity. He is rapidly sinking. Pulse scarcely perceptible, and extremely rapid; respiration grows difficult; sensorium not in the least affected. Rept. spts. vin. Gall. He expired at 5½ P. M.

In this unhappy case, the utility of venesection was doubtful, perhaps it was injurious. He sunk from the moment he was bled. This was one of those low cases where there was no alarming symptoms: no spasm, purging and vomiting very trifling, yet life was destroyed in 8 or 9 hours from the attack.

Dissection.—The head was not opened, the mental faculties not having been disturbed to the last moment. The viscera presented the usual appearances, being perfectly gorged with blood. The right auricle was almost bursting*. The lungs in a state of congestion, but sound in structure. The liver gorged with blood and sound; spleen in the same state. The stomach was distended with what he had drank for some hours previous to death. The coats of the small intestines thickly injected. The bladder contracted closely to the pubis.

Remarks.—I have also generally observed, that the superior extremities become cold and covered with sweat, much earlier and more constantly than the legs and feet. It will be seen, however, by the following dissections, that there was congestion and sometimes even effusion in the brain, which

* This appearance, as I have before mentioned, is not noticed by Orton. I have seen no dissection in which it was absent.

clearly indicate the necessity of the early application of blisters to the scalp. Was not the absence of any complaint, on the part of the patient, in this case, occasioned by oppression of the brain and *nervous system ?*

Case 2.—Joseph Clayton, ætat. 20, admitted 14th June, 7½ A. M., of weakly habit. He has been too free in his bowels for two days past. Last midnight purging became frequent with nausea; but no vomiting. Whole body under the natural heat; features shrunk; voice weak and hollow; lips livid; no pain; complains of nothing but thirst and weakness; stools are frequent, and clear as urine; pulse 120, and feeble. Pulv. ipecac. gr. xx. stat. capiend.; et post affect. quam prim. sumat spts. vin. Gall. c. aqua calida. Applr. abdom. et suris sinapism. After the emetic, which brought from his stomach only the liquid he had drank, his whole body grew warm; pulse improved; countenance and voice became nearly natural: strong hopes are entertained. 9½ A. M. His stools have become frequent again, pulse lost its force, whole body cold, hands and arms covered with profuse sweat, cold as ice, sickness at stomach trifling, a wild stare of the eyes, slight spasms of the legs and feet. Sumat calomel ℈i c. tinct. opii gt. xl. Rept. spts. vin. Gall. ℥ij. pro re nata. Appl. capiti toto emplast. lyttæ. Bags filled with hot sand to the extremities. He expired about 6 P. M. Spoke rationally to the last.

Dissection.—The vessels of the brain were in a state of congestion, no effusion on the surface, or in the ventricles; lungs sound and gorged with blood; right ventricle and auricle of heart in the same state; stomach distended with fluid and flatus; liver gorged, gall-bladder full of natural bile; surface of small intestines of a rose colour, so thickly were the blood-vessels injected; bladder as usual drawn up to the pubis, and about the size of a walnut.

Remarks.—The effects of the emetic were certainly most cheering, and such as to induce any one who witnessed them to have recourse to the same practice in similar cases, where the patient, like this one, felt nausea, but *had not once* vomited.

Case 3.—Serjeant William Mouat, ætat. 32, admitted 19th June, 1½ P. M., of weakly habit. At day-light this morning a purging came on of watery liquid, with very little pain: after 4 or 5 stools, nausea took place, and he vomited twice. He complains of drowsiness, is uneasy without knowing why, as he feels no pain; whole body under the natural heat, feet and hands cold, the latter covered with sweat; face much altered, features shrunk, lips livid; voice weak and hollow. He is sensible of deafness. He has just passed a stool like conjee. For the first time, since the attack, he now feels slight spasms of the feet and toes. Pulse 100, small and feeble. Sumat stat. calomel. ℈i, opii gr. i. Appl. suris et abdom. catapl. sinapis. spts. vin. Gall. ℥ ij, aqua calida et nuc. mosch. commixt. p-r-n. capiend. ℞. tinct. opii ʒi, ipecac. rad. ʒss., aq. oryzæ ℥ viij: m. ft. enema 2d horis injiciend. 3 P. M. Since last report he has vomited six times, purged thrice, no urine voided. He is worse in every respect: upper extremities, face and breast, pour out cold sweat. Pulse much increased in frequency,

and barely perceptible. He complains much of the sinapism on the abdomen: sensorium not affected. Reptr. spirit. vini. Gall. 5 P. M. He grows rapidly worse: body extremely cold and clammy; the cold sweat has ceased to flow*; pulse 120, scarcely perceptible. He is perfectly rational, though his eyes have a wild stare; he tosses incessantly from one side to the other. Appl. abdomin in loco. sinapism. empl. lyttæ. Reptr. spirit. vin. Gall. et enema. 9 P. M. Since last report he vomited twice; and immediately after the pulse stopt. He died at midnight. Seven hours were lost in this case.

Dissection.—The vessels of the brain were unusually full of blood, the ventricles distended with clear water, and about two ounces of bloody serum under the cerebellum. As usual, the right auricle of the heart was almost bursting; the left in the natural state; the lungs in a state of congestion; the liver not much altered in appearance, but rather darker than usual; the stomach was pale and empty; small intestines covered with the usual rose-coloured blush; bladder *drawn* up to the pubis.—1. I have always noticed that the patients complain most violently of the blisters on the abdomen, but seldom notice that on the scalp.—2. What then occasioned the deafness and drowsiness?—3. Was not this proof of the sensorium being affected, and of the great necessity of blister to the head?—4. I have always seen the stomach of this colour; and not inflamed as many describe it.

Case 4.—William Royce, ætat. 23, admitted June 20th, 9 A. M. Last night at 11 o'clock, he was seized with a purging, and had been twice sick at stomach. He suspected nothing of the nature of the attack, and at seven this morning asked for a purgative, and had one of calomel and jalap. He said nothing then of being sick. At 9 he came to the hospital. A few stools were yellowish; afterwards like conjee with white flakes. Pulse 110 and small, whole body under the natural temperature. V. S. ad ℥ xxiv. R. tinct. opii ʒi, ipecac. rad. ʒss, decoct. oryzæ ℥ viij: ft. enema 2d horis injiciend. After the bleeding he sunk rapidly† for two hours; had occasional spasms of the legs, *very slight* however; the upper extremities were covered with copious sweat, cold as ice. He complained much of pain in the præcordia; pulse 120, remained nearly imperceptible for three hours. He threw up, for several times, the brandy and water, or whatever drink he took. Appl. empl. lyttæ abdomin. et sinapism. suris. spts. vini Gall. ℥ij ex aqua calida pro re nata capiend. At 2 P. M. his hands became dry, and pulse more distinct: at 3 P. M. pulse considerably better, and countenance improved. He complained loudly of the blister and sinapism. 5 P. M. Since last report he continued to improve: pulse became fuller; and every symptom favourable. Sumant hora somni calomel. gr. x, opii gr. i.

* I have not noticed whether the cold sweat generally ceases before death. Orton at page 72 says, "it is probable that it (*the cold sweat*) will be found like the other secretions, to become entirely suppressed before death, but this I have not distinctly observed."

† It must be observed, that this was the mildest of the above cases, the stools being yellowish *after* he was admitted into hospital.

Remarks.—Although this was a much milder case than the preceding ones, and of course more favourable for bleeding (or I would rather say there was less danger in bleeding), still the bad effects of it were well marked, and led Mr. Forster in the opinion I have before mentioned. This man was not of a weakly habit.

Case 5.—Robert Walker, ætat. 24, admitted July 29th. This was an extremely severe low case when admitted; he had been ill 6 hours, the pulse was scarcely perceptible, and he had deafness. The other symptoms were as usual. Sinapisms were applied to the legs and abdomen; hot sand bags to all parts of the body. Calomel. ℈ i. c. tinct. opii gt. 50, æther. sulphur. ʒ i. aq. menthæ pip. ℥iss, was given immediately, and hot brandy and water often. He did not improve during the night. The next morning, at 6 o'clock, he appeared, if any thing, rather better; but the deafness had increased, and there was *considerable tinnitus aurium.* Blisters were applied to the head and chest; other remedies continued. He lingered till 10 P. M. During the day he had had no stool, nor vomiting. A purgative of calomel and rhubarb was given in the evening, and an enema with ol. terebinth. ℥ ss. but without effect. Both blisters rose well and were filled, though the pulse could scarcely be felt.—In this case, were not the deafness and *tinnitus aurium* sufficient proofs of an oppressed state of the brain? Thus might not the torpid state of the bowels have been occasioned *latterly* by an increase of this oppression?

Dissection.—Vessels of surface of brain turgid; about three drachms of fluid in the ventricles, and at least five at the base of the brain and commencement of spinal cord. Lungs greatly gorged with black blood, of a pitch-like consistence; vessels of parietes of chest also very turgid. Right auricle of heart also distended with blood of the same appearance. Left side of heart empty. Stomach and intestines greatly distended with flatus; not much vascularity of small intestines. Bladder as usual. Liver much gorged with blood like that in the chest: gall ducts pervious. Stomach filled with fluids taken before death, mixed with thick mucus. There were a few spots on its internal surface, more vascular than natural.

THE END.

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